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The Burlington House Loan Exhibition.

THE special feature of the loan exhibition at Burlington House this winter is a selection of models, designs, and studies by Alfred Stevens, collected in the water-colour room. These mostly come into the category of decorative art, for even the sculpture is in every case grouped with architecture or architectural detail, and hence this room has a special interest for architects and designers of decorations, of a different kind from that presented by the other galleries.

We are not aware that any such collection of Stevens's designs and studies has been exhibited before. "An over-rated man," said an eminent painter who was looking at them; an opinion, however, which painters are apt to hold in regard to sculptors. But in two senses Stevens has been somewhat over-rated by his admirers. In the first place, granting his remarkable power and style in the treatment of the figure as a decorative adjunct, the style was to a certain extent an echo of Michael Angelo as far as the figures were concerned, and the repetition of a certain stamp of Renaissance work in the smaller detail. The borders of the designs for plates made for Minton's, Nos. 6 and 15 in the catalogue, show this very plainly; there is a certain *cachet* about them of the great Florentine manner, but the great Florentine manner had existed first. There is no one else, perhaps, who has reproduced its spirit so powerfully; only it is in a certain sense a revival. Of his figures, especially the two fine groups on the Wellington monument, it must be added that the revivalism is only that of general manner; the designs themselves are quite original. The other deficiency in Stevens's work is that his accessory decorative detail is, like that of many figure sculptors of less power, mostly very faulty. The best bits of detail in the collection are perhaps those of the majolica vases of which the drawings also are shown (52, 53, 61, 62), and the designs for daggers and sheaths (57, 58); the best designed of the daggers, however, is shorn of its surface ornament shown in the drawing. The decorative detail of the Wellington Monument is in many points very faulty, and indicates a deficiency of architectural sense, though the Monument as a whole is no doubt the finest English monumental work of modern times. A large model of this stands in the middle of the room, and near it is the model of another monument which was never carried out; that submitted in competition for the proposed monument on the site of the 1851 Exhibition. This is a fine piece of design as a whole: but here again there is want of architectural perception in placing a frieze in such high relief and so bossy in surface immediately below such a heavy projecting cornice; the cornice seems to have no wall to carry it, and sits on the heads of the figures; a low relief retaining more of the unbroken wall surface is required, to carry the cornice. The frieze is called in the description a "bas-relief," but it is not one in the proper sense; and it should have been, for its position. A sectional model of the interior of the British Museum reading-room is exhibited, showing a scheme for coloured decoration which would have had a good effect: a series of figure subjects are painted over the large windows, each with a slight painted architectural framework, and forming a band of colour round this portion of the room; half way up the ceiling are oval compartments between the ribs, each with one large figure, and the upper spaces are occupied with coffers with gilt flowers on a dark blue ground. The effect of the whole would have been fine, and very different from the present dingy appearance of the room. In France they would have carried out a design of this kind; in England we only leave to the artist the melancholy consolation of thinking that his friends may exhibit after his death the design for what he would have done had a parsimonious Government allowed him the chance.

If Stevens's detail was not immaculate, his sense of grouping and general breadth of design was very fine. This was nowhere better shown than in his grand sketch for the decoration of the dome of St. Paul's (of which design there is no record in the present exhibition), which was faulty in design too, partly, with the faults inseparable from the school adopted, but at once impressed one as a work of genius from its boldness of conception and large handling. The drawing No. 1 in the catalogue, "Design for the decoration of a cove ceiling," is a very bold and rich piece of decorative design; it is a domical ceiling over an octagon plan, with a circle and a hexagon alternately in the upper spaces, filled in with figures and conventional design, with a reclining figure in each of the arches at the springing of the cove; it is a mere sketch, but as such is one of the boldest pieces of design in the room. The defect of the school to which Stevens had devoted himself comes out again in another ceiling design (20), where a heavy architectural niche is painted on the concave of the dome on a deep blue ground; a feature quite out of place in such a position; and in the inlay design for a slab at the side of a mantelpiece (40) we see the same kind of defect in the heavy architectural panel resting on the heads of figures below. All this kind of thing is to be found among the decorative work of the Renaissance which Stevens had so lovingly and effectually studied; but he seems to have assimilated its defects as well as its power. The numerous red chalk studies of figures, not highly finished but quickly done for purposes of study and composition merely, show in many cases the artist's characteristic power of seizing fine and effective attitudes of the figure. Among other things exhibited is a sketch for the door of the Museum of Practical Geology in Jermyn-street, with square panels filled with small sculpture subjects in high relief; those in which a single figure is placed between colonnettes, with a dark shadow behind, are especially effective. We need not add that this too, was never carried out, and the existing door is a dead blank of panelling.

As a whole, this is a very interesting exhibition in the room which we hope it is now intended should be devoted, at the annual loan exhibitions, to decorative art, so entirely neglected at these exhibitions till a year or two back; and it is a fitting commemoration of a remarkable artist.

Among the pictures the great point of the year is in the array of large works by Velasquez on the north wall of Gallery III. The centre-piece is a life size nude (unusual enough with Velasquez), called "Venus and Cupid," the Venus lying on her side with her back to the spectator and her face shown in a mirror held up by the "cupid." This is a very remarkable work of its kind, not highly finished like a Titian Venus, by the side of which it would appear somewhat coarse in execution; but the way in which the framework of the body is indicated, and the bold colouring of the

flesh, are equally remarkable, though the work is rather a grand sketch than a finished picture. The face seen in the mirror, by the way, is not of the type or make which the back of the head of the figure suggests, and seems to have been put in hastily without any attempt at realism, which of course was not Velasquez' aim or profession in art. The portrait of "Mariana of Austria" (132), a seated figure in preposterous costume, with a hooped skirt like a round table, and a head-dress standing out in a great bag on each side of her head, is remarkable for the expression of insolent hauteur in the features. What Velasquez really thought of the society of Sultans and Sultanas that he painted it would be interesting to know; but the portrayal of that expression of pride and disdain of the whole world which, as we know from historical and literary evidence, represented the natural mental attitude of the Spanish grandee of the period, was at all events a task singularly congenial to the genius of Velasquez. Vandyck did something of the same kind in his portraits, but not with the power and thoroughness of Velasquez. There is one Vandyck in the exhibition, however, the armoured portrait of Count Nassau Dillenbourg (153), which goes near to rival Velasquez in force of expression and character, though not in power of execution. Near this is a remarkable Rembrandt, "Portrait of a Man" (151), a formidable man, whose physiognomy expresses a rock-like stubbornness, possibly in some degree due to what the painter has brought to it: for Rembrandt seems often to have made a portrait a groundwork for the expression of his own power. It is interesting to contrast this, in which the head is everything, with the portraits of Velasquez in which, with an equally powerful treatment of the head, costume is also so highly elaborated. Velasquez' treatment suited the stamp of persons whom he had to paint, with whom costume was so very important and elaborate an accessory that it would almost have seemed sometimes that the costume was the essential and the figure encased in it the accessory. In the portrait of "Admiral Pareja" (133) the head itself is of sufficient picturesque power to hold its own against the costume. These three, Pareja by Velasquez, the portrait of a man by Rembrandt, and the Count Dillenbourg by Vandyck, are three very remarkable examples of the ideal force of artistic expression which a great painter can infuse into the simple portrait of a man: it is rarely that three such examples by three different painters are to be found in the same room together. In female portraits, except the Velasquez already mentioned (Mariana of Austria) the exhibition is not strong this year; the most pleasing are Romney's "Mrs. Stables and two of her daughters" (154), in which the child in her mother's arms is lovely; and Reynolds's "Viscountess St. Asaph and child" (158), a very charming Reynolds a good deal faded and discoloured; there is a lovely semi-Oriental type and *tournure* about the head and bust of the countess: the head of the infant on her knees is also beautifully painted and full of life. Romney's portraits of "The Hon. Henry Chaplin, M.P.," and "Mrs. Chaplin" (41 and 45) are very good specimens of simple portraiture, the latter is also artistically interesting inasmuch as, in composition and in the treatment of the foliage background, it is an obvious and intentional imitation of the manner of Gainsborough. Another portrait in the first room is interesting from the name of the artist, the life-size sketch (for it is little more) of "Robert Williams" (24), captain of the Cumberland Fleet, a Yacht Club of which the Duke of Cumberland was president, and which was the precursor of the present Royal Thames Yacht Club: a portrait of a bluff figure in a nautical costume with a telescope under his arm, by "J. M. W. Turner, R.A." whose name is about the last that the figure itself would suggest, though the hand of Turner is traceable in the treatment of the sky and background.

Generally speaking, the English pictures of the year are not very much. There are two Callcotts about which much has been said, "The Shrimper" (44), and "Hampstead Heath" (161). The latter is a really grand thing, so powerful and so like Crome in manner that doubts have been suggested as to whether it is not truly a Crome: we never saw a Callcott at all like it before. "The Shrimper," however, shows the same kind of power in sky and composition, but it has been much over-rated; the breaking sea in the foreground is very bad, and is one of the many examples of the extraordinary blindness to the real forms and movement of sea among painters until a very recent period. A wave is not seen flopping on the beach as if it were all one piece of stuff, like the edge of a shaken blanket; Callcott never saw that, nor did Creswick ever see waves as he has represented them in a seapiece opposite (14), with all the waves along the shore of the same section, with a sharp edge at the top and the same concave and convex lines before and behind. Among the old painters Backhuysen is as bad or worse; in his large painting in the second room (102) the square-rigged men-of-war sail about in fine style, no doubt, but the stuff they are sailing on is no more like sea than the movable seas of grey paper inflated by bellows that are sometimes seen in models. In the present day we have several sea painters who really look at the sea and paint it as they see it, though each has, no doubt, his favourite aspect of it: but this is quite a modern accomplishment in art. Even Turner's seas are often quite impossible both as regards colour and movement.

The pictures to look at in Gallery I., which may be called the English room, are, besides those already incidentally mentioned, Landseer's capital painting of a white terrier, "Jocko" (15); Webster's picture, well known from engraving, "The Slide" (23) a good example of a kind of humour in *genre* painting that is somewhat out of date now; James Ward's "Cows" and "Horses" (29, 31); Leslie's "Mother and Child" (381), fine both in drawing and expression; and Reynolds's "Miss Fanny Kemble" (49), terribly dilapidated but the remains of a most expressive portrait. Danby's once-admired stage effects, "The Ship on Fire" (36) &c., are melancholy examples of work that has had its day and is of no more value to any one; his smaller painting, "The Grave of the Excommunicated" (40), has a certain poetry and truth of effect.

The pictures of the Dutch realists in the second room have been said in the newspapers to be as remarkable as in any former year, which is certainly an exaggeration; they include some very bad pictures that were never worth exhibiting at all; they also include a minority of works that are first-rate of their kind. Among them are Lord Ashburton's Jan Steen "The Carouse" (93), an interior with many figures, less vulgar and repulsive in physiognomy than is often the case with this painter, and full of life and reality. The same owner's two small works by Maes, "An interior" and "A Woman Sewing" (100, 104) are beautiful examples of works in which the interest consists in a single figure placed under effective conditions of light and painted with unaffected simplicity. In the first-named work, however, we cannot help thinking some change has taken place in the pigments; the flesh is worked up in the warmer portions with small touches of red which, as now seen, appear far too strong and spotty in effect. The Queen's Teniers, "Woman Peeling Turnips" (103), is essentially a study of still life in foreground objects, first rate of its kind; a more interesting Teniers perhaps is the "Village Dance" (84). Van de Velde's rather large cattle picture (107) should be looked at; but a superior work is the small painting of "The Haymakers" (115), a perfect little work both in regard to the figures and the landscape in which they are placed.

Gallery IV., which marks the limit of the exhibition, is filled with a series of portraits in decorative borders, by Daniel Mytens and unknown painters of the Dutch school, from the collections of the Marquis of Townshend and the Earl of Sussex. They illustrate a special type of portrait-painting, and have a striking decorative effect in combination, but their artistic interest as pictures is not very high.

SUPERINTENDENCE.—II.

IN the previous article* we took it for granted that the architect writes his own specifications, and does not depute the work to a quantity-surveyor or any other person. In fact, we look upon the specification as an explanation and amplification of the drawings, and consider that the production of the two ought to be as nearly simultaneous as possible. It is certainly difficult to see the wisdom of employing another person to explain and amplify one's own drawings. Opinions, however, differ on this point, but there can be little doubt that an architect will be more likely to make alterations in a specification written by another man, who could not be cognisant of all his ideas, than in one written by himself with the full knowledge of the necessities of the work gained by interviews with his client, by inspection of the site, and by the preparation of the drawings; and it is this deviation from the specification against which the architect must be chiefly on his guard.

Many clients are "kittle cattle" to deal with. There is a story,—true enough, we believe,—told of a certain duke, how, on returning home after a short absence, he saw almost completed an entrance-lodge with an arched gate-way, which doubtless the architect thought very fine; not so the duke. Calling the architect to him, he asked, "Why the —— have you built such an ugly thing as that? Pull it down!"—the next day the place was dismantled. There are not many architects who enjoy the patronage and humour the whims of dukes, but many have to bear the vexatious intermeddling of clients, who, unlike the afore-mentioned nobleman, object to pay for the alterations which, as the work proceeds, they demand. The best preventive of so many variations from the contract is for the architect to explain the drawings thoroughly to his client before tenders are obtained, and to state the different kinds of material proposed to be used. In many cases it is wise to take a client, if possible, to rooms of the sizes shown on the drawings, as figured measurements give to most people only a vague idea of the real dimensions. In brief, study the client's requirements carefully, and do not be satisfied until he understands with some degree of minuteness what kind of building is proposed to be erected for him. For all variations from the contract are vexatious, sometimes to the contractor, sometimes to the proprietor, almost invariably to the architect.

The architect must be above all suspicion of unfairness or partiality. He must treat an honest contractor with the same consideration he shows to a good client, and must endeavour to repress the unwarranted grumbling of a crotchety client just as he turns a deaf ear to the specious tales of a smooth-tongued builder.

It is frequently somewhat distasteful to the architect to meet committees or bodies of men for whom work is being carried out, as there are sure to be two or three members of such a body, who,—perhaps because they desired the appointment of another practitioner, perhaps because they are born fault-finders, and find it a necessity to exercise the privilege of grumbling,—at any rate, for one reason or another, seek every occasion of throwing stones at their architect. These malcontents must be boldly faced; to their malice the architect must oppose the most transparent honesty and sincerity. He must seek interviews, rather than decline them, must go before such a body of men unbidden, rather than fail to meet them, for his absence will in the eyes of enemies be an acknowledgment of shortcomings, and behind his

* See page 2 *ante*.

back more bitter things will be said than before his face, and untrue statements may pass uncontradicted. We could point to so many instances of discredit attaching to architects, simply because of their neglect to appear before clients of this kind, that we consider this note of warning by no means unnecessary. Again, it must be remembered that newspapers report the proceedings of many public bodies, and aspersions on a man's character, which pass uncontradicted at the time of utterance, may stare in print before the public, and will then surely prove detrimental to the architect; there are always wiseacres, "Sir Oracles," who say, "where there is smoke, there must be fire," and so a man's reputation may be endangered. To work harmoniously with a committee is a notoriously difficult matter, and needs all the architect's tact, courage, and truth.

There is one other matter (pertaining chiefly to the proprietor) which we wish to mention, and then we will pass on to the most difficult part of our subject,—the architect's dealings with contractors. There are men, all the world over, who wish to get more than their money's worth. The architect will frequently meet with examples of this class, who, after receiving tenders in open competition, manifest a preference for a builder whose tender is not the lowest, but whom they can trust to do good work; instead, however, of offering him the contract at his own price, they wish him to lower his tender to, or, at any rate, towards, the lowest tender received, and beg their architect to see him with this object. It is dirty work; let the architect wash his hands of it, and attempt to dissuade his employer from such a course, for it will surely be prolific of trouble. But if the proprietor himself arrange with the builder such a reduction, the architect has no option but to accept the arrangement. It is almost certain that the builder will feel justified in attempting to "take out" of the work in quality or finish the value of the reduction, and the architect will, therefore, do well, before permitting him to sign the contract, to give him clearly to understand that, as the original drawings and specifications have not been altered, it is only right that they be strictly adhered to; this is justice, but in such a case we should have little hesitation in tempering justice with mercy.

"Mr. Rickman considered that the first qualification of an architect was to possess patience, and, after that, the most essential quality was decision, and in the latter quality he (Mr. Cates) feared architects were often wanting, especially in insisting that the work should be executed as specified." In the previous article we inveighed against all unnecessary deviations from the specification, and the young architect will do well at the very commencement of practice to set his face dead against all variations from contract which the builder without proper instructions makes in carrying out the work. To pass *one* thing which is not according to the specification paves the way for passing another; the architect's measure is soon taken by the contractor, and the latter, if dishonest, learns to consider a specification as a document very good, perhaps, in its way, but not by any means intended to be enforced. In estimating for future work he acts on this assumption, and tenders at a price for which the work could not possibly be carried out if the specification were to be strictly interpreted. By "cutting low," as he terms it, he takes work out of the hands of more honest contractors, whose consciences are less accommodating, and whose tenders are consequently higher. The evil done by these cheap (and nasty) builders falls to some extent upon the client, for he gets inferior work, but—he gets it at less cost; it falls more, however, upon all other builders, who, through greater honesty, have submitted higher tenders. This, let us say, is no fancy picture. We are acquainted with one respectable builder, who always, on delivering a tender to a certain architect, accompanied it with such remarks as, "I've quoted for 'thirds' deal; you specify 'best'; but the others will reckon for 'fourths' and 'fifths.'" His remarks were true enough; and it was a bitter thing for him to see work taken out of his hands by dishonest contractors. He himself would not quote for an inferior quality without acquainting the architect with the fact, but his conscientiousness militated in a great many cases against the acceptance of his tenders. For an architect to pass inferior work is setting a premium on dishonesty, and making the battle of life harder for good men. Young architects must beware, for on the conduct of their first commission will depend, to a great extent, the whole course of their future practice.

In spite, however, of architect's care and contractor's honesty, mistakes will occur and accidents happen to render some portion of the work less perfect than it ought to be. Rain may bow a wall, frost may crumble its mortar, inferior material may be used by a workman if it be nearest at hand, the tramping bricklayer may neglect proper bond or omit the pargetting of flues, the rough-and-ready labourer may put mud or clay into the mortar-mill instead of sand, and so on; for all these the contractor is really responsible, but it would be unwisely harsh of the architect to demand in every case the entire undoing and reconstruction of such work. It would often be more satisfactory, under these circumstances, to make a proportionate deduction rather than shake the building and perhaps cause considerable delay by cutting out the bad and inserting new. In such cases the architect will do well, however, to acquaint his client with the inferiority and proposed deduction, for the latter will be disposed to doubt the architect's vigilance if the information be conveyed to him by any other channel, or if he find it out himself. For a client to find fault justly with work or material does to some extent lessen his confidence in his architect. The client may, however, refuse to be guided by the architect's advice to let such work remain and to accept a certain deduction as compensation, and may peremptorily demand the work to be as specified; in that case it is the architect's duty—a hard one, we know—to require its alteration. The contractor must suffer for his own negligence and that of his men.

Where, however, the architect is convinced that the contractor has of malice aforethought substituted worse material, or scamped the work, his duty is plainer. The work must, if possible, be re-executed. A deaf ear must be turned to the thousand-and-one plausible excuses which the wily contractor will offer for his conduct. An architect writes: — "I remember an instance of a small plumber inserting pieces of 4 lbs. lead in flashings for which 5 lbs. lead was specified. At once I wrote to him demanding the removal of all such lead from the building; the next day he came to the office, threw upon the floor about a dozen pieces of 4 lbs. lead, and in a torrent of words told me 'I'd got 'em all,' wanted to know if I thought him a rogue, and declared that he had used all his 5 lbs. lead on the building, and, rather than delay the work, had made out with just so many pieces of lighter weight. For a moment, I really felt that I must have done the man some wrong — he seemed to think himself not sinning but sinned against. However, I merely told him that it would have looked better if he had mentioned the circumstance to me *before* using the inferior material instead of *after*. I had gained my point, and he has since been more careful." But instances might be multiplied indefinitely; they are plentiful as blackberries. It may be wise and will certainly be courteous of the architect to listen to what a contractor has to say *before* executing work as specified, and to consider any suggestions he may make (remembering always, however, that an architect should be predisposed to adhere to his specification rather than deviate from it); but it is almost invariably foolish, a sign of weakness, to take notice of excuses made by a builder after his dishonesty has been discovered. The best advice we can give to architects on this point is—cultivate decision, and having stated your honest opinion that the workmanship is deliberately slovenly, that the material is of set purpose worse than that specified, maintain your opinion, and, where possible, demand the re-execution of the work. Let your fiat be unalterable as the laws of the Medes and Persians. Do not be wheedled out of it; if you are a young man, do not be bullied out of it; do not, in any case, be bribed out of it. If you once yield, you have established a precedent, to which the contractor will for ever appeal. If, on the contrary, you compel a builder to undo bad work, to remove inferior material, it is a lesson to him and to all others, and will prevent much trouble in the future; it is a precedent to which you yourself can always appeal with satisfaction, knowing that you have acted justly and have not neglected your client's interests.

As already observed, however, it is not always advisable to have inferior work re-executed, on account of the delay and other damages which such renewal might entail. In this case, a deduction must be made from the amount of the contract, but the question arises, how much must be deducted, merely the difference in value between the work as specified and as executed, or more? At first glance, one might say, the mere difference certainly. Is this really fair, however, to the proprietor? This gentleman has, by his architect, asked for a certain excellent material,—say a building stone sound, hard, and of good weathering qualities,—but in place of this he has been supplied with stone very similar in appearance at first, but soon crumbling. The deception is not discovered until the work is so far advanced that a demand for removal of the inferior stuff might practically be a demand for the demolition of the building and the erection of a new one. The sternest architect and the most irate client would probably stop short of that, but to deduct the mere difference in cost between the two stones would assuredly not be just to the proprietor. Some things are dear at a gift, and an ill-weathering building-stone is one of those things, for it soon makes a building appear scarred, as if afflicted with a skin disease, and necessitates continual expense in repairs. But there is still another point to be considered; the great danger of making a proportionate deduction for the bad work which a contractor has deliberately executed, is this—he is not punished for his dishonesty; he loses nothing by the transaction, and is encouraged, if he be so minded, to continue his malpractices, for, even if he be found out, he is not a loser, and if he be not discovered, he gains considerably. For these two reasons, therefore, it is best to deduct for such inferiority more than the mere difference in value between the work as specified and as executed. If the contractor demur, give him his choice—deduction or re-execution. Only, do not leave the settlement of the amount to be deducted until the completion of the contract; it is best to state, in writing, the demand for re-execution or a certain deduction, at the time of complaint respecting inferiority of the work. This course will save much bitter wrangling afterwards.

It may happen that the builder will refuse to proceed with the work rather than replace the inferior material or submit to the architect's proposed deduction. In ninety-nine cases out of a hundred the client will sustain his architect's position in such a case, and will have no hesitation in dismissing the builder according to the terms of his contract, and in placing the work in other hands.

There are architects, however, who worry contractors unnecessarily by their ill-advised clinging to minor details of construction. It may be that in the detailed drawings of a piece of joinery a certain method of framing and jointing has been shown, but the builder, desirous of saving labour and material, attains the same result in a different manner. By all means, let the builder enjoy the benefit of his superior practical knowledge; he has taught the architect a lesson which it will be unwise of him to despise. It bespeaks a little mind if an architect be ashamed to alter a specification even though he learn, before the

work is done, that a better method of procedure can be adopted without increase of cost.

The general conditions of a specification frequently contain a clause to the effect that "no deviations from the drawings and specifications shall be made without the *written* authority of the architect," but we wonder how often an architect takes the trouble to carry out his own rule of writing his instructions. Better far to omit the clause altogether than to stultify oneself by not adhering to it, for how can an architect expect a contractor to be bound by a specification part of which he himself sets at nought? But, best of all, to insert the clause and act up to it. It is really not a difficult matter, and its advantages are obvious. We are acquainted with an architect who for this purpose carries what is known as a "Commercial Travellers' Order-book," in which, by means of a black sheet and an agate style, two copies are obtained at one impression. One of these copies is given to the contractor, the other remains in the book. For convenience of reference every note is classified under one of four heads,—"extras," "deductions," "alterations" (which are partly extras and partly deductions, one or the other preponderating), and "instructions" (the last comprising all orders for re-execution of bad work, removal of inferior material, deviations from contract involving no variation of cost, and so forth). This system keeps the architect in mind of deductions which he might otherwise forget, and shows the contractor for what extras he can justly claim, and thus vastly facilitates the preparation of the builder's account at the completion of the work.

It may be urged that the architect who spends so much time in the superintendence of work will have no time left for preparing designs or for office-work generally. (There might be no great harm done, if the architect did stick to his drawing-board rather too little, and to his buildings rather too much.) In reply to this, we would say that an architect may, and ought to, employ his pupils partly in this work of superintendence, take them to the building, point out those things to which particular attention must be paid, and let them inspect the works two or three times between his own visits. The pupils would thus obtain much valuable practical knowledge, and would be some check,—however slight,—upon tke actions of a dishonest builder. There are many youths at the end of their pupilage, and many assistants of several years' standing, who seem never to have seen work in progress; we cannot think that the architects, who received premiums from such, did their duty in return.

The architect's path is narrow and difficult,—a little slip and he may be ruined. An error in calculation, a manufacturer's mistake, a contractor's carelessness may lead to the collapse of a building, and to a consequent loss of practice. But there is another thing which tells even more severely against a man, and that is the acceptance of illicit commissions, or what in plain English should be called "bribes." Modern trade is honeycombed with this system of dishonesty, and builders' merchants have learnt the trick. The young architect is very likely to be tempted by a dishonest contractor; reject the bribe at once,—the larger the bribe the greater the loathing,—and avoid that builder in future, for he has forfeited his birthright of being considered an honest man. This journal has so frequently inveighed against all illicit commissions that it seems a wearisome reiteration to say anything further on the subject, but as the temptation is usually offered to the architect during the erection of a building, we venture to consider it as one of the dangers of superintendence. The architect must absolutely refuse to accept all secret commissions from firms whose goods he has specified or ordered. The commission *really* comes out of the client's pocket without his knowledge,—is, in fact, filched from him, and the architect has no more right to it than he has to the goods themselves. It would be a good thing if architects, to whom bribes have been offered by manufacturers or merchants, would absolutely refuse to have any further dealings with such firms,—boycott them until they saw the folly as well as the dishonesty of the system. Let each individual architect, as he values his own good name, and as he loves his work and has the honour of his profession at heart, do his utmost to put a stop to this corruption.

In conclusion: the architect will do well in trying to put work into the hands of contractors of proved honesty, so that in their case the truth may be shown of that trite proverb,—"Honesty is the best policy."

NOTES.

IT is with great regret that we hear from Milan of the untimely death of Signor Brentano, the young architect who gained such a brilliant success almost at the outset of his career in winning the competition for the Milan façade; and who, as was remarked in an article in our columns, had begun his professional career where many would have been only too happy to leave off. He died at Brussels a few days since at the age of twenty-seven. A more melancholy instance of the cutting short of a career of brilliant promise has seldom occurred.

AT Florence repairs are being executed with great activity, by order of the Government, in the celebrated Church of Santa Trinità, built by Nicolo Pisano in 1250, and famous in the history of art for its frescoes, painted by Ghirlandaio, Andrea del Castagno, Albertinelli, &c. Unfortunately the rage for modernising everything destroyed a great part of its artistic value when Buontalenti repaired the church and reduced it to about its present state. The works which have already been completed are the following: 1. Two marble altars have have been placed in the Spini and Ardinghelli chapels. 2. The architectural and pictorial ornaments of the Strozzi chapel have been repaired. 3. A new decoration in the style of the fourteenth century has been painted in the Spini chapel. 4. Decorative paintings have been restored in the transept of the lateral nave to the right. Excavations have been made in the central nave, and the crypt, built in the twelfth century, has been discovered. The discovery took place while the pavement of the church, which was in a very bad state, was being repaired and brought down to the level of the ancient church, such as it was in the thirteenth century. The crypt is built of *pietra forte*, and has three semicircular apses. When discovered, it was found to have undergone considerable damage, especially when the church was rebuilt in the sixteenth century, as we have already said, and when graves were dug in it in a less remote period. The pavement of this crypt or tribune has also been partially discovered; it is composed of a reddish cement, and before the altar of the chapel was a portion of mosaic of small pieces of white marble, evidently the work of the ninth or tenth century. Round the mosaic is an ornament of white foliage on a black ground. Within the border which this ornament forms, are two symbolical figures of dragons looking towards each other. The discovery is particularly interesting, as no other specimens of mosaic had as yet been found in Florence. These fragments, as well as some remains of a very ancient construction in *pietra forte*, belonged, undoubtedly, to the church which, according to the historian Villani, stood in this spot under the name of Santa Trinità since the year A.D. 801. The excavations were continued, and resulted in the discovery of the crypt, of the ancient doorway and of the staircase leading to it; of this, four steps are still to be seen. Between the ancient pavement and the modern one, which has been removed, a large marble slab has been found, on which a recumbent figure, much worn out, is sculptured; we learn by an inscription that this was the tomb of Roggero Buondelmonti, General, of the Order of Vallambrosa, who died in 1319. Other researches led to the discovery of some remains of the original fresco ornaments on the wall of the nave, covered with a thick layer of modern plaster. The beautiful marble door belonging to the Chapel of B. Bernardo degli Uberti has likewise been found, and behind the modern façade of Buontalenti, the ancient one in Gothic style, of Nicola Pisano, has been discovered; it has alternate stripes of white and *verde di Prato* marble, in the same manner as in many churches of Pisa, Pistoia, and other towns of Upper Tuscany.

THE Imperial German Archæological Institute has just issued its second "Ergänzungsheft." It is entirely devoted to the discussion of the recent excavations at Ægæ, the interest of which has proved to be mainly architectural, and to be of special importance as throwing light on the more prolific "finds" at the analogous hill city of Pergamos. The contents of this volume are so strictly technical that they can only be profitably discussed in connection with the very abundant illustrations. The ground-plan given shows that Ægæ,—the modern Nemrud-Kalessi—has yielded up three temples, a theatre, a stadium, various extensive porticoes, a market-hall of which there are substantial remains above ground, and city walls in an unusually good state of preservation. All these are discussed in minute detail by Dr. Richard Bohn, and there are supplementary chapters of the history of the city and the evidence of the inscriptions found by Dr. Shuchardt. We may comment in passing on the wisdom shown by the Institute in allowing these supplementary volumes to be bought separately. Subscribers to the other organs of the Institute need not take them, and the general public can. They relieve the text of the "Jahrbuch," and are each of them addressed to a separate section of archæological specialists. We are promised shortly an "Ergänzungsheft" that will be most eagerly looked for, — a treatise by Dr. Dörpfeld and Dr. Emil Reisch on early Greek theatres recently excavated, and the light they throw on the disposition of the Greek stage.

THE last number of the "Jahrbuch" (1889, III.) presents a new feature, which will be gladly welcomed by all archæologists. It has always been the custom to publish in this journal a list of the "recent acquisitions" of the Berlin and British Museums. The directors have wisely decided to publish henceforth a similar list for all the smaller museums. Such a publication is, if possible, almost more necessary for small than large museums, because such are more likely to be overlooked. The present number begins with Dresden, and here, as in some other cases, it has been decided to let the summary extend back over several years. The "Jahrbuch" has also ever since its reorganisation led the way in the matter of giving immediate woodcuts of important acquisitions. This plan can scarcely be too highly commended. It nowise supersedes the detailed and adequate ultimate publication, but its effect is to put that publication into right hands, and in reality to hasten it. Often an important monument remains unpublished because the local director,—who alone knows of it,—does not happen to be a specialist in the particular line it illustrates, and does not feel equal to expounding it. Now, the right man is sure to know of each newly-acquired monument, and equally sure to ask and obtain permission to publish and elucidate it.

IN the January number of *Murray's Magazine* is an exceedingly temperate letter from Sir Arthur Blomfield—wonderfully temperate considering the provocation he has had—in reference to the preposterous article by Lord Grimthorpe to which the editorial wisdom of that magazine recently gave currency. His best sentence is his definition of Lord Grimthorpe's "principles of restoration" as

amounting to this—"Whatever *I* think right *is* right, and the opinions of all who do not agree with me are not worth consideration." As Sir Arthur observes, "principles such as these possess the undoubted merit of extreme simplicity and of easy application to every possible subject under all possible circumstances, but they have the serious defect of making discussion impossible." We doubt however the advisability of answering Lord Grimthorpe, whose lucubrations are better regarded as those of a person not perfectly sane. If any one could take away the faculty with which he was foolishly entrusted by an ignorant Chancellor, well and good: but that is the only thing it would be any use doing. Nor is it by any means wise to stick to the theory that the old nave roof and flat ceiling might have been preserved. It might possibly have been done with a great deal of piecing and patching, but neither roof timbers nor ceiling were in a condition to make it worth while: we speak from detailed inspection at the time. The ceiling, besides, though it looked well enough from below, had no artistic value; it only required a pair of compasses to design it. Architects weaken their own position by adhering to an untenable position of this kind. The injuries Lord Grimthorpe has done to St. Albans do not consist nearly so much in what he has taken away as in what he has put in its place.

THERE seems to be a happy inclination at present among very wealthy people to give large sums for works of public beneficence or utility; and the *Pall Mall Gazette* the other day published a list of suggested good works that might be accomplished, in case any more millionaires are thinking of becoming public benefactors. We will suggest one more for London, a benefit perhaps more for the rich than the poor, but one which commercial enterprise has not been equal to. There was a scheme on foot some years ago, of which we heard indirectly, for the construction of a great sea-water swimming-bath for London, of far larger size than any of the existing swimming-baths (300 ft. by 100 ft. was spoken of); the water to be pumped through a main laid to the nearest point on the coast whence pure and uncontaminated sea-water could be drawn. The scheme had been so far seriously considered that an architect had been consulted as to the site and plans; but capital could not be found for it, apparently, as a commercial speculation. Now if any very rich Londoner is inclined to immortalise himself by a great public benefit at his own cost, here is an opportunity for a work which would be an immense boon to many Londoners. The existing comparatively small fresh (?) water swimming-baths in London are, in the summer, inconveniently crowded at the only time when most people can use them, viz., in the morning before the work of the day begins; and at the best these tepid fresh-water baths, in which so many persons plunge during the day, never have the healthy and bracing effect which could be obtained from a sea-water bath of ten times the area, with sufficiently continuous supply to keep it fresh. We make the suggestion in the hope that it will be considered by some modern Crœsus who can afford either to give or to risk the money. It might, in the latter case, bring an adequate return. The waste water might be utilised for street watering; an important saving in the ordinary water supply.

IT is edifying to read the opinions of recent correspondents of the *Times* on the subject of London street paving. One wiseacre actually writes to recommend that we should return to granite cubes (unquestionably an admirable form of pavement for endurance and for draught), forgetting that the very essence of the whole difficulty about London pavement lies in the provision of a pavement which shall be at once durable and noiseless, and that wood and asphalte were tried because the noise of the constantly-increasing London traffic on stone paving, and even on macadam, was becoming an irritation and a nuisance that could be endured no longer. There are streets of dwelling-houses in London, for some years laid with wood or asphalte, which would be emptied of their tenants in six months if, with the present traffic, granite paving were replaced: people's nerves could never stand it. One man writes to say that asphalte is the most injurious pavement for horses that ever was; another that his carriage horses fell over on it and were not hurt, and therefore he thinks asphalte is "not a bad pavement for horses to fall on." We opine that, to a horse falling, asphalte is not quite so hard and cruel a surface as it looks, and that there is a certain amount of give in it: but we have no doubt whatever that more horses fall on asphalte than on any other form of pavement, and that it is the worst of pavements for a horse to get up from, owing to the want of foot-hold. But we are entirely against the recommendation of Sir Robert Rawlinson in Thursday's *Times*, to adopt wood pavement. We quite concur in his remark that much wood pavement has been unsatisfactorily bedded, and that hollows and sinkings in wood pavement are really the result of bad foundations, not of the defect of wood as a paving material. But this does not affect the fact that for a city like London wood pavement is essentially insanitary, and neither Sir R. Rawlinson nor any lesser letter-writers will persuade us to the contrary. It is desirable to avoid as much as possible the use in London of porous materials which hold dirt and "germs," and no one can possibly doubt that wood is one of these. The general acceptance of wood for street pavements would mean that London would be less clean and less healthy than with most other pavements. The suggestion of "J. P." in the *Times*, that asphalte might be covered with a thin sprinkling of dry sand, is practical as far as the result to be obtained is concerned, but the process of keeping up the sand coating over an area of many miles of streets would be a more serious matter than he has realised. Possibly the solution of the difficulty might be found in a new method of permanently finishing the surface of the asphalte so as to leave a sufficiently roughened surface for better foothold.

THE six candidates for the second competition for the Sheffield Municipal Buildings have been selected, but it is not intended that the names should be officially published. From a Sheffield paper we learn that a well-known Sheffield firm are the authors of one of the selected designs; a communication made to the press, we presume, by the architects themselves. As the Borough Surveyor of Sheffield informs us, in a courteous note, that it is preferred that the names should not be published, we have no wish to encourage competitors to traverse the wishes of the Sheffield authorities, who have shown that they understand their business very well and are carrying on the matter with every wish to act fairly towards all concerned. We are informed that there is an intention to exhibit the non-successful sketch designs, provided a majority of their authors give consent. One of the competing architects writes to us to suggest that this is not the right time to do this; that it should not be done till the final selection is made, when the unsuccessful sketches should be exhibited along with the successful ones, for better purposes of public criticism and comparison. He adds that this would in another sense be more fair to the unsuccessful men, as in spite of their non-success many of their plans may contain valuable suggestions which would be thus thrown open to be studied and possibly assimilated by "the six," or some one of them. There is something in both these arguments, in which we are inclined to concur. We may add that there is much more interest in such an exhibition when the successful designs are included. We remember the exhibition of the unsuccessful sketch-designs for the Manchester Town Hall, when there was the same feeling expressed by many—that there was very little point in it when it was impossible to compare them with the selected designs.

THE promoters of a small competition for local public offices at South Stockton, not to cost more than 2,500*l.*, have been comparatively liberal in premiums, offering three of 50*l.*, 25*l.*, and 15*l.*; but what they give with one hand they seem to wish to take away with the other: they provide that "the three sets of selected plans, specifications, working drawings, and schedules of quantities, to become the property of the Board, who may employ their own Surveyor or any other person to superintend the erection either with or without any alteration therein. The Board, however, desire to know from competing Architects what remuneration they will require if employed to carry out their own plans and give all needful general superintendence, and a letter giving such information should be sent with the plans." This latter clause, which amounts to a proposition to give the commission, if at all, to the man who will do it cheapest, is a most improper one to offer to the members of a liberal profession, and no architect of good position would have any anything to say to it. The demand for specifications amd working drawings with a set of competition drawings is so absurd that it may be charitably supposed it is dictated by ignorance.

AN article on "Hoorn and Enkhuizen," written and illustrated by Mr. Reginald T. Blomfield, appears in the January number of the *English Illustrated Magazine*. Coming as it does so soon after Mr. Blomfield's utterance before the Architectural Association the paper is especially interesting; it shows how well he can practise what he preaches. His drawings, eight in number, are indeed quite different from the "wiry, mechanical pieces of work," which he says are conjured up in a painter's mind by the words "an architect's drawing"; but we cannot think that the effective sketch of "The Harbour Gate, Hoorn," is improved by the scrawls which do duty for a sky. The "Water Gate, Enkhuizen," is a pretty piece of work, and the detail of the doorway to the Burghers' Orphanage at the same place is crisply shown. The article is picturesquely written, but will, we think, be of more interest to architects than to that almost, but not quite, omnivorous creature, the general reader. Two short passages are worth quoting for the sake of showing how carefully Mr. Blomfield has studied the buildings of which he writes:—"The two lower niches have cannon-mouths carved in stone and painted black, which the guide-books describe as real guns," and again, "In the top stage of the gable are carved two figures of armed men, supporting the English arms. M. Havard gives a tradition that this shield was captured from an English ship in the days of the redoubtable Van Tromp, and set up as a trophy. He describes it as the original shield supported by the effigies of the negroes who took it. One would more easily credit this tradition if it were less circumstantial, for the shield is not of wood but of stone, and the figures that support it are not negroes at all."

THE January number of *The Portfolio* is prefaced by a short sketch of the history of the periodical by the editor, whose writing, whether on himself or on other subjects, is always interesting. The first of a series of articles on "The British Seas," with illustrations of sea and shipping, promises well, and the name of Mr. Clark Russell to the literary portion of it is a guarantee that the subject will be treated with knowledge. An article on Mr. Walter Crane and his works is illustrated by a reproduction of his energetic design of the "Chariots of the Hours."

AN appeal is made for contributions to a fund wherewith to meet the cost of repairing and enlarging the parish church,

St. Mary Magdalen, Woolwich. The church was rebuilt in 1728-38; it has a plain exterior, whilst the interior is after the Classic style then prevalent. It is proposed to add a larger chancel, together with side chapel and organ chamber; to construct a more commodious vestry; to reglaze the windows; to restore the stone coping, which is pronounced to be in a damaged state; and to fence in and level the churchyard. The western tower, outer walls, and roof were repaired a few years since, and are in good condition.

THE large pasteboard almanac for this year issued by the Stationers' Company bears a picture of the Tower of London, as seen from the Thames, looking towards the north-east, and embracing the river frontage from the Middle to the Develin (Galighmae or Iron Gate) Towers. This drawing, made and engraved by Mr. Louis Godfrey, delineates the Tower as it appears after the demolition and more or less supposititious restoration which has been effected, within the past four or five years, by the Office of Works. The cupolas on the four angle-turrets of the White Tower are drawn to a rather too lofty and pointed form. The outline of what we take for the Byward Tower—and it can hardly be any else—is indistinct; whilst the Garden (or Bloody) Tower shows battlements, which that tower has not. The large block, containing the guard-room, with the soldiers' school and reading-rooms, seems to be somewhat out of position. This ugly building has replaced the gabled "Seven Houses of Office," of *temp.* Henry VIII., that stood between the Garden Tower and the Coldharbour, and may be seen in the model of the fortress (1841), which is now preserved in the Armoury as recently rearranged within the central keep.

SOME correspondence has been printed in the *Times à propos* of modern and ancient mummies, and the supposed head of the Duke of Suffolk, father of Lady Jane Gray, preserved in Holy Trinity Church, Minories. Mr. Seymour Haden sees a likeness in the features of that relic to two portraits of the Duke in the Tudor Exhibition, and Mr. J. Standish Haly is satisfied that the more popular belief as to the head being the Duke's is authentic. Some say it is that of the Duke of Monmouth. In our columns of Jan. 9, 1886, we referred to a highly-probable theory of its being the head of Edmund de la Pole, Earl of Suffolk, executed in 1513. Mr. Standish Haly insists upon the circumstance that the Duke of Suffolk, executed in 1554, "resided at the Minories, that establishment having been granted to him on its suppression as a religious house." But the Minories did not belong to him up to the period of his death. He lived there in part of Edward VI.'s reign; but made it over in 1552 to his two brothers, Lords John and Thomas, with one Medley, and went to Sheen, where he was living at the time of his share in Wyatt's uprising. On the other hand, Edmund de la Pole, whose family had once owned the manor of the Rose, St. Laurence Poultney, was buried in the Minories, whilst it was still a convent, as were also his daughter, a nun there, and his wife. Curiously enough, the Rose manor was given, after the Earl's attainder in 1513, by Henry VIII. to his brother-in-law, Charles Brandon, Duke of Suffolk, as Shakespeare reminds us:—

> "Not long before your highness sped to France,
> The Duke being at the Rose, within the parish
> Saint Lawrence Poultney."
>
> —"King Henry VIII.," i. 2.

IN his little book upon the Barbers' Hall*, and that Company's treasures, Mr. Shoppee, F.R.I.B.A., gave an interesting account of the large picture by Holbein, which may now be seen in the Tudor Exhibition. The painting executed reputedly upon canvas, but really on oaken panel, shows Henry VIII., seated in state, delivering to Thomas Vicary, Master and "King's Surgeon," a new charter (1541) to the then freshly-united companies of Barbers and Chirurgeons. The figures comprise Sir John Ayliffe, Master in 1539; Nicholas Symson and Edward Harman, "King's Barbers;" the celebrated Dr. William Butts, and Dr. John Chamber, Warden of Merton College, Oxford, and Dean of the College of the Virgin and St. Stephen, in Westminster. To the extreme right stands J. Alsop, physician to the King. This picture was lent to James I. and his successor, in order that likenesses of Henry VIII. might be copied therefrom. We may add that the Company's records demonstrate that instead of having suffered damage in the Great Fire, as is asserted by Pepys, who was minded to offer 200*l.* for it (see his diary, 28 August, 1668) the painting had been carefully removed into a house in Moorfields, and so was saved. The day before his visit with Pierce (a surgeon) to the Barbers', Pepys had passed from Whitehall to the Matted Gallery, then under repair, and writes—"And pity to see Holben's work in the ceiling blotted on, and only whited over!" Walpole avers that the picture had been retouched, but its owners say it has undergone no other change than by a careful cleansing in 1719, and again, in 1878, by Mr. George Redford who, *teste* Mr. Shoppee, discovered it was painted upon on a gilt ground.

* Description of the Pictures and other Objects of Interest in the Hall and Court Room of the Worshipful Company of Barbers. . . . by Charles John Shoppee, some time the Company's architect and surveyor. . . . 1888.)

THE *Antiquary* commences a "new series" with the present year. Among the articles is one on a supposed Saxon altar-slab at St. Benet's, Cambridge, by the Rev. G.F. Browne, who has made ancient altar-slabs and tomb-slabs a special study. Among other points the author makes the suggestion whether the ancient practice of cutting five crosses on altar-slabs was done as symbolical of the five wounds of Christ. We should think this extremely probable. "The Church Plate of the County of Dorset," by Mr. F. E. Nightingale, is the subject of an article signed C. R. Manning, including some well-executed illustrations, one of which shows a curious and very unusual cup from Wraxall.

PROFESSOR MIDDLETON proposes during next Easter vacation, from about March 22nd to April 22nd, to give a course of lectures in Athens and the neighbourhood with a joint class of students from Oxford and Cambridge, on the buildings and topography. He will be glad to admit also to these lectures any architectural students from the Royal Academy, the Institute of Architects, or the Architectural Association. Professor Middleton's book on Rome has proved that he has a quite exceptional faculty of reading and expounding the data of ancient buildings, and those students who are able to avail themselves of this opportunity will find it well worth their while to do so.

Lectures on Architecture and Sculpture at the Royal Academy.—Professor Aitchison, A.R.A., is announced to give the following lectures to the Academy students:—Monday, Jan. 27: "Roman Architecture,—Preliminary." Thursday, Jan. 30: "The Laurentine Villa of Pliny the Younger. Monday, Feb. 3, Thursday, Feb. 6, Monday, Feb, 10, and Thursday, Feb. 13: four lectures on "The Private Houses and Palaces of the Romans." The lectures on Sculpture will be as follows:—By Mr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum: three lectures (Monday, Feb. 17, Thursday, Feb. 20, Monday, Feb. 24) on "Sculpture in Greek Temples." By Professor J. H. Middleton: three lectures (Friday, Feb. 28, Monday, Mar. 3, Friday, Mar. 7) on "Florentine Sculpture in the Fourteenth and Fifteenth Centuries."

The North-Sea-Baltic Canal.—It has now been decided that there are to be two gates only on the North Sea-Baltic Canal, viz., at each end. This will enable vessels to pass through the canal at any tide in eight hours.

SPIRES, TOWERS, AND DOMES.*

THE title of this paper, "Spires, Towers, and Domes," is a comprehensive one, conjuring up to the imaginative mind a boundless vista of graceful towering monuments of architectural skill. Who has not felt the powerful appeal made to the senses as the view of a great city unfolds itself for the first time to the gaze of the traveller, with its well-proportioned monuments reaching into the heavens, viewed on a brilliant morning, or, may be, standing out against the rich red hues of an evening sky, domes, towers, and spires one and all testifying to the artistic feelings and restless industry of mankind in all ages?

It is hard to conceive a more onerous, difficult, and responsible part than the one architects of past ages have taken in the building up of the magnificence of many European cities. On their thought, on their work, without doubt the picturesqueness, the popularity, the importance, and even the prosperity of many a European capital has rested, and in no more prominent direction has architectural skill contributed to such success than in the design and disposition of the graceful Gothic spire, of the stately campanile, and of the voluptuous symmetry of the classic dome.

Every one here has surely felt the awe-inspiring effects of a grand interior, and yet a flow of sentiment is easily checked, the fire of enthusiasm easily quenched, by a commonplace thought, by a mundane fact. Nothing destroys the poetry of an impression so completely as the consciousness of a material defect associated with the object of our admiration. It is in this regard that we can realise the difficulties that had to be overcome by, and the onerous responsibilities that rested on, the designers of past ages. Their works not only have had to meet the requirements of the ages in which they were built, but they are now subjected to the artistic criticism and the scientific investigation of nineteenth-century enlightenment.

It, then, must ever be the greatest care of designers that there shall be in the creations of their craft nothing that shall suggest instability, nothing to indicate decrepitude, nothing that shall point to a finite existence. If this has been achieved then there will be no danger of the first heat of enthusiastic admiration being chilled by a closer knowledge of the constructive anatomy of our architectural idol, whether it be spire, tower, or dome.

Spires, towers, and domes comprise an important section of an architect's work, and form a subject not limited by the dogmas of a style nor bound by the chronological limits of a period. Its vastness presents a difficulty as to its most profitable treatment in a short paper. The historical, the æsthetic, the constructional and scientific divisions of the subject could each in themselves furnish ample material for separate discourse. This paper, however, will be found to embody a large proportion of the constructional and scientific, clothed with a slight historical and æsthetic mantle.

From the earliest recorded times the greatness of man's mind in the material world has sought expression in lofty erections. In the futile endeavours of the descendants of Noah, 2247 B.C., to outwit the anticipated wrath of an awful Deity by the erection of Babel's tower, and in the more successful efforts of mankind in other lands and in later centuries, we are conscious of the existence of a sentiment that finds expression in the erection of buildings that point upwards and away from this worldly world. China, India, Asia Minor, Northern Egypt, the Moorish lands, Italy, France, Spain, Germany, our own country, have reared many and glorious examples of spire and tower design, but, strange as it may seem, we turn in vain to Greece, the fountain-head of architectural refinement, for an example, and we find it not. The Grecians, a race gifted beyond measure, intellectual to a degree, ultra-refined, almost divine in their artistic feelings, failed to rise above the worldly horizontality of architrave and cornice.

We have seen the campanile development of Italy, with all its wealth of detail. We are familiar with the solid, sturdy growth of Gothic tower architecture in Northern Europe. We are conscious of the beauties and delicacy of the French treatment. But, with all this knowledge, where can be found towers and spires to

* A paper by Mr. S. B. Beale, read at the meeting of the Architectural Association on the 3rd inst., as elsewhere mentioned.

equal in boldness of conception, grace of outline, and beauty of detail, the Gothic,—aye, and even many of the Classic towers and spires of this our own country? The sequential development of English architecture as exemplified in the ancient ecclesiastical buildings of the Gothic style is exceptionally marked by the development of spire and tower design.

In reviewing the history of spires, our attention, for strong reasons, must be confined to English forms and English construction.

The simplest form of spire conceivable is the four-sided pyramid rising from the square tower, with its sides parallel to those of the tower, and overhanging, thus forming slightly projecting eaves upon a corbel table. Southwell Tower is an example. In the Romanesque period the spire has its first true conception. Thaon Church, Normandy, with a masonry pyramidal termination in height about 1½ diameters, and a steeper one at Valladolid, with a height of 2½ diameters, undoubtedly embody the spire principle.

In the Early Gothic of this country spires obtained a firm hold on English church builders, beginning with the octagonal pyramid and its attendant broaches of masonry springing from the angles of the usually square tower, and butting against the splayed sides of the octagon.

From the simple broached spire we turn to an important change. Instead of the spire projecting slightly beyond the faces of its tower base, it sprung from a base area entirely within the edges of the tower. This modification opened up a wide field for elaboration, which was taken full advantage of during the Decorated period. Beginning with the parapet simply, followed by a combination of parapet and broaches; parapet and pinnacles; parapet, broach, and pinnacles; parapets and angle turrets; elaborated again by double pinnacles, and, finally, by the introduction of miniature flying buttresses springing from the pinnacles or turrets, and abutting against the splayed sides of the spire. The Mediæval builders in this period produced spires of complicated design and elaborate detail, contrasting with the effective simplicity of the early broached spire in a very marked manner.

In the early part of the Perpendicular period, the spire had reached its highest state of development and elaboration. Spires were constructed from a vertical polygonal drum standing upon a rectangular tower; the surface of the spire was in some instances enriched with cusped panelling. Crockets had free play on the minor turrets and pinnacles at the spire base, and up the ribs of the spires themselves. Ornaments and features were crowded on until the zenith of spire design was reached. Then the reaction came, and square towers were once again generally erected without the superincumbent spire. The decline did not occur, however, until some very beautiful examples of each of the different kinds here scheduled were left to tell their tale.

There are some unique combinations of spire and tower in the minor English Mediæval parish churches, among which may be mentioned an octagonal spire springing from a tower of octagonal plan from base to summit; the same, accompanied with angle turrets springing directly from the ground, of which there are examples at Stanwick, Northamptonshire, and at Wickham Market, Suffolk.

It would be difficult indeed to specify the date of the erection of the earliest tower in Great Britain, and what were the exact reasons that prompted its erection. Reasoning upon probabilities, we may arrive at a tolerably reliable conclusion in the latter case.

The tower, rising as it does above the general height of the buildings reserved for the common use of mankind, possesses physical pre-eminence which naturally suggests its erection in those positions and amongst those buildings which require accentuation either to indicate their positions from afar, or to testify to their public or private importance.

The tower of Mediæval times in secular buildings served for a look-out, as a refuge, and as a place of vantage in troublous times. There are a few ecclesiastical towers having some quaint legends and curious histories associated with them. Of these the tower of Boston Church, Lincolnshire (in itself a magnificent example) has been immortalised by the writings of Jean Ingelow. In romantic verse the poetess has told of the pealing forth of the bells in the church tower at a time of particular danger from floods. Many human beings were drowned who were not able to take advantage of the periodical warning rung out from the bells of Boston tower.

There are numberless reasons given for the erection of towers in connexion with ecclesiastical edifices. Archæologists assure us that the chief ground for erecting the tower was to procure a position for the hanging and ringing of bells. Now, it is asserted that bells of large size were not cast until a date long after large, massive, and high towers had been in existence. This fact rather destroys the idea of bell-raising being the prime cause for ecclesiastical tower building. Certain it is there were many causes working together to justify the erection of towers for one or other of the purposes enumerated. Towers may form a valuable artistic addition to a fabric, and some may serve a purely utilitarian function. There is a further class, the claim of which to existence it is difficult to define.

As a nation's architecture is mostly measured by the standard of its ecclesiastical work, so must we turn for the best examples of tower design to English and foreign minsters, priories, and cathedrals. At the outset it will be well to notice the positions of the tower in regard to the body of a cathedral or minor edifice consecrated to Divine worship.

In the southern countries of Europe the tower was frequently detached entirely from the main building,—a notable instance being Pisa. It has been suggested that the fear of the vibration set up by bell-ringing in the tower prompted the arrangement. It is to a more powerful reason, however, that we must look as the cause of so marked a feature in church planning. The builders of Italy, for instance, in erecting a tower, never appear to have been satisfied unless they produced walls 10 ft. thick and upwards. The excessive weight of such construction brought abnormal loads upon the foundations, producing subsidence, and it is to this fact (not fully appreciated then, nor has it been properly understood since) that we must look as the reason for the isolation of the tower. A settlement (no uncommon thing) due to the great weight of the tower would have entailed disaster and ruin on the cathedral if the tower had conjoined with the general structure. A diagram on the walls, with a little subsequent explanation, will bear out this view.

The position over the crossing of a church as the site of the tower can scarcely be improved upon, combining, as it does, the essential advantages of a centralised position, all the component portions of the church leading the eye of the observer up to it when seen externally. In view of the modern tendency in church-planning to reserve a large congregational area about the preacher, this central tower affords every facility for the effective lighting of a portion of the church usually in the dark. Of the important English examples of this kind that occur to the mind are the cathedrals of Salisbury, Winchester, Norwich, Worcester, Gloucester, and the Abbey of St. Albans.

Although the central position for the tower possesses many advantages over any other, to the unstable manner in which central towers have been constructed has been ascribed their location at the west end of the nave in more modern instances.

We are assured by the architectural historians that the great inconvenience to worshippers entailed by the frequent works of reparation to the central tower brought about its removal to a position less contiguous to the area reserved for service. This fact may or may not explain the adoption of the western site as a very suitable one for a single tower; the principal point in which this paper is concerned is, that the ancient builders to whom, in other directions, we owe so much, did not erect their central towers with a sufficient regard to economy of material.

The western site, on the extremity of the longitudinal central line of the nave, is a very general position for the towers of the parish churches of England. The extremities of the aisles sometimes came right up to the front or west wall of the tower, thus flanking it on both sides one story high, and in other cases the tower stands clear of the main edifice, only joined thereto on the east side. It has been advanced that this latter is the proper arrangement for a single west tower, if it is to receive its full significance and importance.

There are other less-favoured positions for the tower of an ecclesiastical building that may be noted. Of these, the least objectionable one is the transept site, north or south. Of the others, the position for a single tower to be most avoided is that to the north or south of the west front.

The otherwise fine tower of St. Mary Redcliff, Bristol, is to one side of the west front.

In England's cathedral towers are exhibited the respective values of each position. Chichester, with its central and detached tower; Ely, with its central and west tower; the two transept towers of Exeter; the three or more towers of Lincoln, Durham, Wells, York, Canterbury, Peterborough, and Lichfield recur to the mind as showing combinations of towers that are peculiarly successful in their architectural grandeur.

The detailed consideration of tower design in plan, in arrangement, in roofing, and in its strict architectural treatment, cannot be done justice to on this occasion, and is, therefore, not attempted.

Each country has some peculiarity of arrangement. Italy has its circular and polygonal plans. Germany has the characteristic oblong plan; the towers, usually extending over the whole west-end of the church, have been very aptly termed narthex towers. While of English towers the great majority are square, or very nearly so, in plan.

It is not perhaps just to bring the towers of various countries into review order for critical comparison, when it is remembered upon what widely-differing agents their designers have relied to produce the architectural effect of the whole.

A tower that relies for effect upon the beauty and variety of the coloured marbles used in its erection and embellishment cannot be criticised from exactly the same standpoint as the tower that relies upon its fenestration for its effect, or with the tower that appeals to the eye by reason of its exceeding beauty of outline. The one, when viewed as a distant object in the landscape, may well suggest the pumping-tower of a waterworks, and its beauty will not be appreciated without the aid of a telescope. This tower must be viewed from the area immediately around its base, while the beauty of the other towers may be seen miles away.

We may each have our own sympathies directed towards the tower design of a particular age, style, or country. But there are good grounds, patriotism aside, for maintaining that of the towers and spires remaining from the Mediæval ages, in which may be seen grand conception with artistic detail, the erections of North-west Europe, and particularly of our own country, must stand in the first rank.

Unfortunately, many a beautiful spire has been lost to us for ever, its ruin and fall arising out of ignorant construction and misuse of material,—an evil extending into later and even current times.

The Norman period of English architecture is in this country looked upon with peculiar reverence; due, perhaps, more to its romantic associations than to its incipient beauty. Now, whatever æsthetic value there may be wrapped up in the massive grouping and rude ornamentation of Norman work, certain it is that there was in this period, and later, an extraordinary prevalence of bad construction, to which is traceable the ruin of many a fine abbey. The evil effect of it is even felt in this century, and arises in some such manner as the following:—

Contemporary church architecture is not much valued in these days unless a precedent can be stated for each arrangement and each detail of it. It is rank heresy to some minds if the forms and modes of construction now adopted cannot be traced to bygone times. But the designer who draws upon Mediæval ages for the basis of his nineteenth-century churches must be capable of winnowing the husks from the golden grain.

Although no constructor would in these days build up the shafted piers of a church or cathedral with a thin casing of stone, of a thickness only sufficient to work its mouldings on, and then shoot in a loose rubble core, resting content with the idea that a pier had been obtained capable of sustaining the heavy superstructure of a central tower, with the thrusts from the contiguous nave arching, still there are many peculiarities of Norman construction and constructive principles of later styles which are even now religiously followed, and which must subsequently be attended with no less disastrous results than those chronicled on the exhibited diagram.*

The evil, prevalent in the building of many of England's fairest abbeys, cathedrals, parish and

* The diagram here referred to was a list of cathedral towers which have fallen since Norman times.

other churches, minsters and priories, has been the dangerous overloading of foundations and subsoil bottoms.

This is true of the general body of the cathedrals the author has investigated, the weight brought by nave walls on to the foundations approaching very nearly the supporting power of the soil as far as such strength can be accurately estimated. The evil of overweighted foundations is particularly marked in the locality of the towers, and most notably when the tower is over the crossing. Such an instance was the tower of St. David's, South Wales. This tower, 40 ft. square, and weighing over 4,000 tons, first failed by the bodily sinkage of its western side, crushing down portions of the nave, and generally upsetting the perpendicularity of its piers. The expenditure of 11,000*l.* remedied the want of constructive knowledge on the part of the original builders of this tower.

Failure not infrequently occurred at the west tower foundations, and it will be useful to inquire what are the agents generally at work endangering the stability of great towers. Such causes as badly-selected materials (as in the case of St. Michael's, Coventry) are not now dealt with. First and foremost, the most destructive agent is the great weight of masonry in the tower itself cumbering the ground unduly; this overweight being sometimes further aggravated by a tall spire of heavy construction.

The presence of timber in the foundations, occurring as piles, serving no useful purpose whatever, but subsequently decaying and endangering the superstructure, is another cause of failure. The tower of Ely Cathedral sank 6 in. from some such cause, occasioning, as can well be imagined, great ruin to the adjoining wings of the western transept, one of which was taken down and the other repaired. Although no actual mishap has occurred at York, a writer in 1846, remarking on the Minster of that city, chronicled the fact that the tower stood upon very rotten foundations; they crumbled away at the touch, and could be easily probed with a crowbar. The consequence was that cracks appeared in the great tower.

To explain the constructive failure of so many of our fine cathedral towers, it has been said that the Normans erected their work upon the bad foundations of the pre-existing ecclesiastical buildings. This explanation shifts the blame from the Norman builders to their predecessors in these lands; whereas, investigation of the construction, and detailed calculations, show that enormous weights were piled upon a small area of foundation by the Norman builders, a conclusion which rather puts the boot upon the other leg.

It is, of course, possible to build very massive masonry to a great height on ordinary soil if the weight of such construction is evenly and sufficiently distributed over the soil. But what has been the method by which the great weight of many towers has been brought on to their foundations? It has been the almost universal rule to carry central towers upon isolated piers, these piers transmitting the many thousand tons pressure upon usually four points of small area on the cathedral site, showing, in some places, a weight of five tons on the square foot, and in others twenty tons. The very nature of a central tower makes it necessary to carry the upper portion upon piers; but when this is done, the piers should be joined again into a continuous construction under the ground-level by the building of inverted arches of the same width as the upper tower walls, and further, they should be bedded in a wider base of concrete to sufficiently distribute the enormous pressure from the piers of a lantern tower. Some constructors go so far as to say that wherever an arch occurs in masonry or other work which tends to throw unequal weights upon foundations, an inverted arch should be built under the ground-line for each one in the wall above. In church work this system of inverted arches should be built between all the pier bases of the nave arcading, under the chancel arch, and in any other position in which a concentration of pressure is anticipated.

It has been remarked that failure not infrequently occurred at the west tower foundations. In this position, where one would think there was no reason preventing the carrying down of the walls continuously on to the foundation, the walls, in many cases, are arched over, and carried upon four piers at the angles of the tower, presumably with the idea of economising the material that has been so lavishly bestowed up above, but with the sure result of precipitating the destruction of the fabric.

Bells have always been active agents in tower destruction, both from their weight and from the strains set up by their movement and vibration. A rule has been published with reference to the necessary thickness of tower walls intended to support bells, and it runs: The mean internal area of a tower should be one half the external area, and then, if well built and of good materials, the tower will safely bear as many bells as can be hung on one level. A calculation based upon this rule for a tower say of 40 ft. side produces walls 6 ft. thick, assuming its height at three or four diameters high, this, with the weight of as many bells as can be hung on one level, will show a pressure of five tons on the square foot of soil. Add to this the possible weight of a spire, and such a pressure is put upon the foundation that it is little wonder failure ensues.

This particular rule takes no account whatever of the height to which the tower may be built.

Such rules commend themselves to the unwary by their simplicity, and yet the two or three minutes spent in a calculation of such a nature has brought about a world of anxiety, years of regret, and, perhaps, professional ruin.

These errors of misjudged construction are not overrated in this paper. Examples known to the whole world testify to the truth, for instance, the dome of St. Peter's, and the various modifications during erection that had to be made before a lantern was built to that edifice that could be relied upon not to bring the dome down with a run; the unfortunate cases of our own cathedrals; or the many French and German collapses. They all point to the conclusion that the knowledge of and familiarity with the peculiarities, strength, and capabilities of different materials in all the varying phases of construction, is not on a par with the undoubted standard that has been attained in artistic architecture. The science of architectural construction is as far behind our excellence in æsthetic design as the medical knowledge is behind the surgical attainments of another profession.

The disparity arises in but one way. The student of architecture, either from want of guidance or from misdirection in his earliest years, attempts to produce drawings more or less artistic; he is tempted early to study the æsthetics of architecture, the study becomes engaging, even fascinating, until the whole soul is imbued with romantic tradition and architectural lore. It is easily understood how unromantic, even nauseous, the study of the science of construction, and the strengths of materials with their attendant calculations, must have become. A book of formulæ and figures is put aside with impatience, perhaps with disgust. The nourishment of practical knowledge is dropped for the narcotic of archæology.

The principles which are shown by modern science to underlie architectural construction, are in themselves few and simple, and at the same time reliable. A firm grasp of them may be obtained in the first year or so of study. The mathematical knowledge wrapped up in them is not extensive, and should flow without effort from the mind fresh from college or school. Such knowledge once allowed to rust never regains its old vigour. The mathematical and scientific attainments obtained in college life must be carefully nurtured and trained, or they will wither and die under the fierce glow of æstheticism, a sentiment early permeating the whole being of the earnest student.

The few principles which govern tower building may be enumerated very shortly. After having settled the general plan, outside dimensions, and approximate height, the thickness of walls should be tentatively settled, being dependent upon subsequent calculations. Such preliminary judgment should be based upon the least thickness of masonry that is requisite for keeping out weather, consistent with forming a secure and complete bond in the material, and other practical considerations, as window treatment, provision of sufficient abutment for vault springings and corbelling. The approximate weight of the structure may then be calculated, and attention is then paid to the influences which are likely to endanger the stability of the tower when properly constructed.

Towers and spires, above all other buildings, are exposed to the full fury of gales. The force of wind obviously varies directly as the rate at which it is going along, and is given by the following simple formula: $P=\frac{V^2}{100}$, where P is the pressure upon the square foot in lbs., and V the velocity in miles of the wind in one hour. The full wind pressure that has been experienced must be allowed for as tending to produce overturning effect. A careful estimate of what the maximum force of the wind is likely to be in the particular situation must be made. This calculation should never be omitted when designing a spire, for the reason that there is no more powerful agent of tower destruction than that which produces the rocking action of a superincumbent steeple.

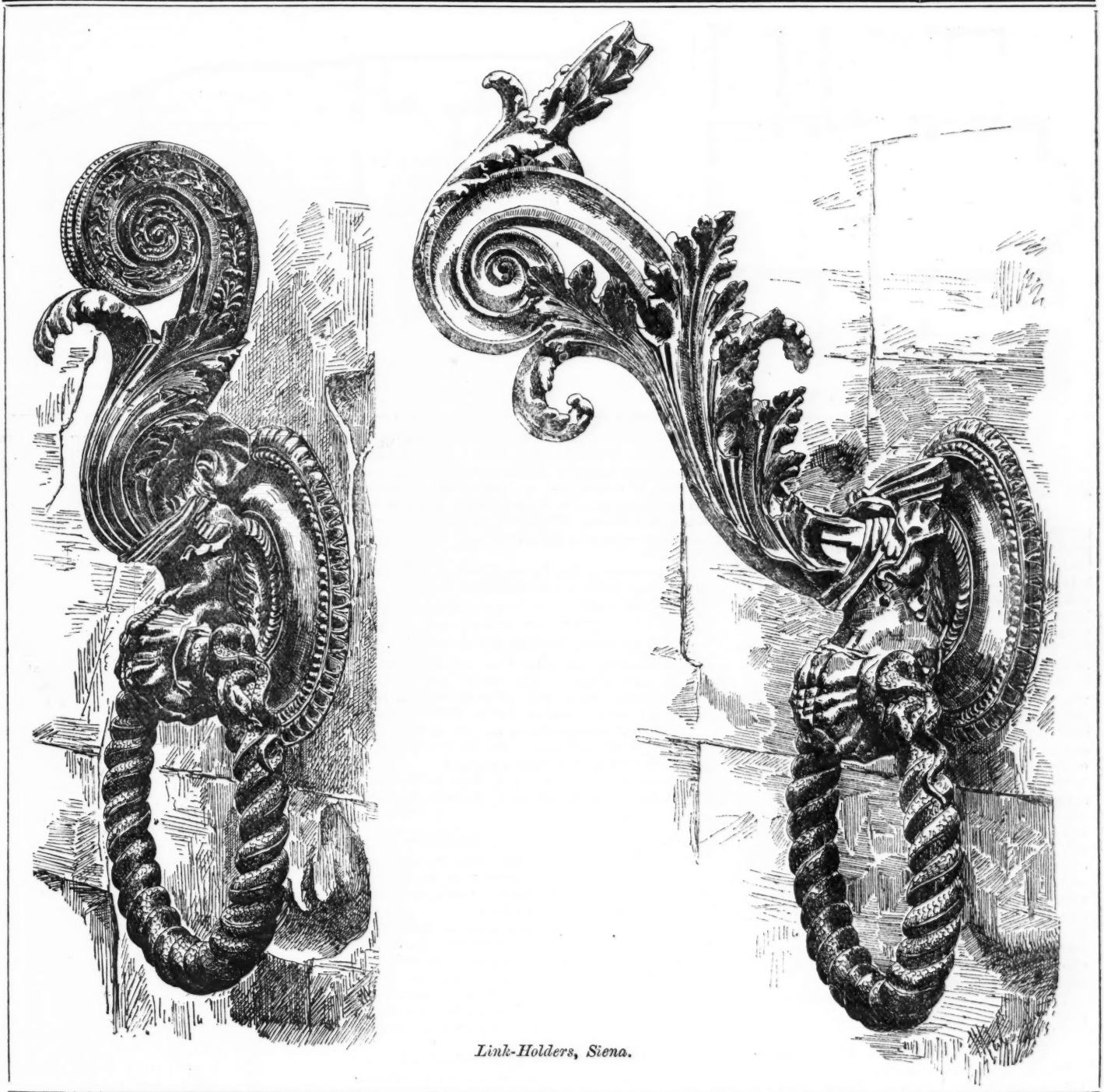
The effect of wind pressure upon a tapering Gothic spire is considerably modified by the plan, elevation, and mode of construction of the spire. The inclination of the sides of Gothic spires, varying as it does from about one in five to one in ten, reduces the estimated horizontal wind pressure by 2 lb. and a ½ lb. respectively on the square foot. This is so small an amount as to be negligible. For an architect's purpose it is unnecestary to find what the reduction is for the vertical slope of a particular spire, as the error is on the side of safety. The plan, if polygonal, necessarily reduces the maximum wind pressure from what it would be if acting upon a rectangular-planned spire,—a reduction ranging usually from one-third to one-half for plainly-constructed spires.

Further, if the spire is built with rounded or other rolls projecting up the ribs at the line of intersection of the planes of the spire, not only is there more surface exposed to the wind, but the edges of discharge for the wind are cut off, and its impactive force aggravated. From experiments of wind pressure on cellular surfaces composed of test plates with only one, instead of the usual four edges of discharge, the practice is based of adding one-fourth of the registered pressure on the square foot for each of the lines of discharge cut off. This operation has been regarded in the calculations of the tower of Pisa on the large diagram.

The vertical faces of lucarnes, or other features, would slightly modify the effective wind pressure upon a spire, and they must be regarded or neglected according to the degree of nicety aimed at.

Having at last obtained a careful estimate of wind effect, the approximate weight of the spire with a tentative thickness of material is then estimated, and the subsequent investigation may be either done by calculation of the moments or by graphic resolution. If the investigation be by taking moments, the point about which the forces are estimated as acting should be one-fourth or one-sixth of the least diameter of the spire from the leeward edge, according to its plan. The calculation by moments is advantageous from its allowing any modification of the weight of the spire that may be necessary to balance the respective moments in foot-tons or foot-pounds of the wind pressure and the spire weight. By this means a reliable spire will be produced, possessing the minimum amount of material required for absolute safety and rigidity. Of all the features of spires that do not contribute to their stability the entasised outline is the most prominent. Its introducion to correct a visual delusion surely subverts the important artistic office of the Gothic spire. Who will say that the spire of St. Vincent's, Caythorpe, or St. Helen's, Broughton, Lincolnshire, and many other highly-entasised spires, are not artistic failures? For stability the entasis thickens the spire out at the wrong place; by its adoption the base is cut off at the very point, where, if anything, it should be widened out.

On the other hand, such features as broaches, pinnacles, miniature buttresses, and turrets, add weight and consequent stability to the spire when clustered around its base. To make the investigation complete, a further point that should be inquired into is the tendency of portions of the spire to slide on the bed-joints. This action cannot possibly occur if the total wind force is less than the normal component of the weight of the spire above any bed-joint, multiplied by the co-efficient of friction of the material used in the construction. Failure by crushing should be looked into; the amount of the pressure on the square foot will, in the majority of spires, be greatest at the base, and will vary in disposition and



Link-Holders, Siena.

amount according to the distance of the centre of pressure of all the forces acting in and on the spire from the outside edge of the spire. The amount of this pressure upon a unit of area must, of course, be some fraction of the ultimate crushing strength of the material. If the actual pressure is too near the ultimate strength, the thickness of the material of the spire will be modified.

From constructional failures may generally be learnt useful lessons for future work. The failure of the spire of St. Aldate's, Oxford, is a notable instance. The spire, built of stone, 50 ft. high, stood upon a tower 56 ft. high; the spire had become considerably out of the perpendicular and dangerous; it was taken down to the level of the tower. The cause of failure was attributed to the presence of a $1\frac{1}{2}$ in. iron bar inserted in the first or base-course of the spire. The rusting of the bar had burst the masonry away inside and out, and it is averred that the pinnacles at the angles only saved this spire from actually falling. This is but another instance of misapplied material; the spire was 7 in. thick at the base, while to a depth of 10 ft. down from the top it was of solid stone. If these conditions had been reversed the original spire might now be standing.

This habit of self-extinction has been very eccentric in its operations. It has deprived the art-loving world of many beautiful examples of English and Continental spires.

The calculation for a tower runs upon the same lines as those for the spire, the modifications being due to the different plan and elevational shape, and the consequent modification of wind effect. The tower must answer the same demands for stability against overturn, safety against sliding on any bed-joint, and possess a factor of safety against crushing; lastly, the total weight brought by the structure upon a unit area of the subsoil should be estimated, and be within the limit of safety. An interesting inquiry into the w-towers construction of Coutances appeared in one of the professional journals some while ago. The result arrived at showed an excess of material in those towers to the extent of 1,000 tons beyond the needs of the case.

Upon the screen is exhibited a chronicle of some of the constructional failures in tower and spire designs in the limited area of England alone. France, Germany, Spain, Italy must have an extraordinary record in this same respect. By far the larger section of those towers owe their failure to the causes previously enumerated. Too much importance cannot be attached to the failure of the towers of the ecclesiastical buildings scheduled here. For the reason that the architecture of a country, if it is considered at all, is measured by the standard of its ecclesiastical buildings.

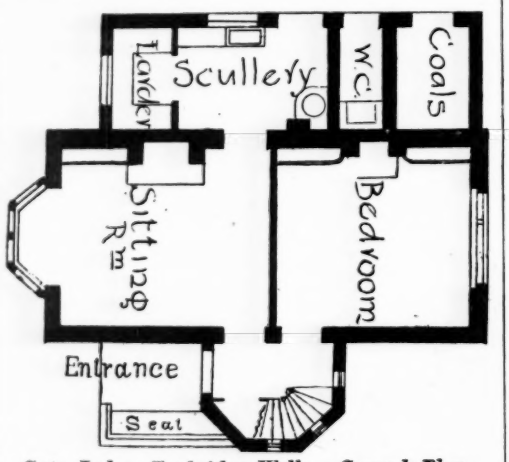
If a factory collapses under the effect of wind pressure, and the lives of an appreciable number of persons come to a painful end, the sad occurrence soon passes out of the minds of all but those most nearly related to the sufferers; but when a cathedral spire or tower passes out of existence the world chronicles the fact for all time.

Who will deny that each and every one of those towers would be now existing as they originally existed if they had been proportioned according to the laws of stability as we know them? Ely Cathedral, and Winchester, Peterborough, and St. David's, with their massive construction, paid the penalty. It is difficult to understand the reason for such massive design as is found in them. The size of a structure can be emphasised without unduly thickening of walls. If for richness of effect, it is a mistake. The luxury of material in the case of a tower can neither be seen advantageously from within nor beheld from without. A window opening may attempt to show the wealth of masonry, while vainly endeavouring to let the light through it, but that is poor satisfaction. The insertion of masonry in spires or towers of a thickness beyond what is absolutely necessary to meet the conditions previously laid down can only be considered as a useless and dangerous practice.*

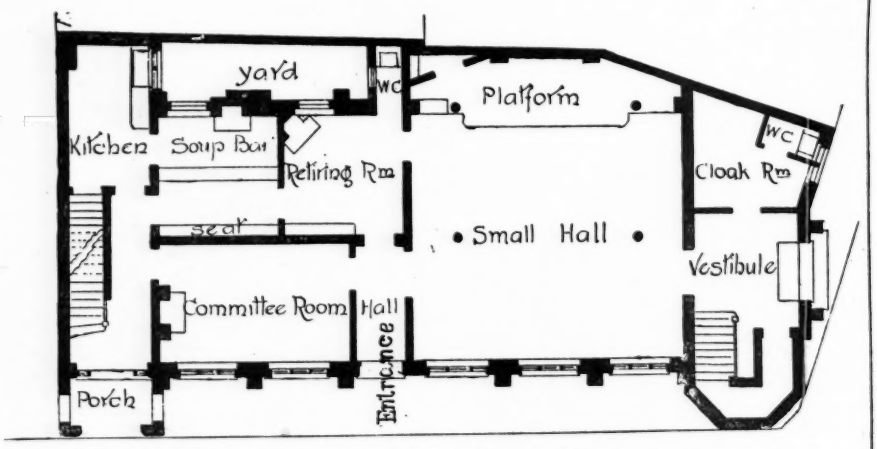
LINK-HOLDERS, SIENA.

THESE metal rings are currently said to have been intended for temporarily placing torches or what in England were called "links" in when not in use; the supposition being that the stem of the torch was run through the ring. Loose rings do not seem the best adapted for that purpose, nor does the decorative scroll above seem very convenient or suitable in such a situation. Their real interest, however, is mainly as bold and fine bits of Renaissance ironwork of a class of which there are examples in Siena that are well known to the curious sketcher.

* The remainder of the paper, with a report of the discussion which followed, in our next.



Gate Lodge, Tunbridge Wells.—Ground Plan (Two Bedrooms over).



St. Matthew's Parochial Hall, Brixton.—Ground Plan (Large Hall over).

Illustrations.

SCULPTURE OVER PORTAL, ST. PIERRE, MOISSAC.

THE doorway over which is found this remarkable piece of Early Mediæval sculpture is a portion of the remnant left of the eleventh-century church at Moissac, the remainder of the church having been rebuilt in the late Gothic period. This portion itself was originally in all probability an addition to a still earlier church, of the eighth or latter end of the seventh century.

This sculpture, with the portal under it, is the subject of one of the fine series of architectural reproductions in the Trocadéro Gallery at Paris, and we referred to it especially in the course of some remarks on the contents of that Gallery in an article published a few months since. Whoever was the unknown sculptor, he was an artist of real genius, in spite of the grotesque of his unlearned modelling. The manner in which the emblems of the four Evangelists are grouped so as to encircle the principal figure is a fine stroke of composition, as well as the ardour with which they and the seated figures beneath all turn their faces towards the divine figure. The row of circular carved pateræ beneath has a fine decorative effect. The centre pier under the lintel (not seen in the illustration) is formed in the most extraordinary manner, of figures of lions spirally intertwined.

The illustration is reproduced from a photograph.

PRIORY MANSIONS, KILBURN.

THESE mansions have lately been erected in Priory-park-road, Kilburn. Each block contains eight suites, with their front doors opening from general landings and with spacious private halls. Each suite is quite complete in itself, having all accommodation and offices usually provided in well-appointed private residences, including tradesmen's entrances at the back, approached by stone steps on landings on wrought-iron supports. All the floors are so pugged that no noise can pass from one suite to another; even the noise of nailing down a carpet would not be distinguishable in the suite below. The building has been carried out by Mr. George Neal, of Paddington, from the designs of Mr. Richard D. Hansom, architect. A plan of one floor is appended. Bath rooms and w.c.'s are arranged on an entresol floor.

COTTAGE BLOCK AT BISHOPSTOKE, FOR THE SOUTH WESTERN RAILWAY COMPANY.

THESE cottages have been designed for the South-Western Railway Company to accommodate the workmen engaged in the carriage factory, which the company are about to move from Nine Elms.

There are 100 cottages in all, which are arranged in one irregular and one complete quadrangle enclosing village-greens.

Each cottage has a garden of ¼ rood, and arrangements are made to supplement this by as much allotment as the men like to take up.

The material is to be red brick in Selenitic mortar, with tiles for the roofs, and the windows are to be of Imperial stone, all wood and paint being thus avoided.

The ground floors are to be bedded on 6 in. of Selenitic concrete laid to leave a clear 1 ft. air space underneath above the ground level. The cost is calculated, on estimates of work already executed, not to exceed an average of 200*l.* per cottage, exclusive of the value of gravel for concrete, which will be dug on the spot.

The architect is Mr. Ralph Nevill, F.S.A., and the original drawing was exhibited in the Royal Academy last year.

GATE LODGE, TUNBRIDGE WELLS.

THIS building contains four rooms, besides scullery and offices. Externally the ground floor, staircase, tower, and chimneys are of red bricks, the upper portion being, in front, half timbered with shingle-faced panels, and at the rear hung with red tiles. The roof is covered with brown tiles, the tower with lead.

The contractor was Mr. A. A. Gale, of Woking, and the architect Mr. Edwin T. Hall, of London.

ST. MATTHEW'S HALL, BRIXTON.

THIS building is a Mission Hall attached to St. Matthew's Parish Church. It is at the corner of Talma and Probert roads, between Brixton and Herne Hill stations.

It contains on the ground floor a small hall for lectures, work parties, night schools, &c., a retiring room attached; a committee room, a soup bar and kitchen, and a cloak room. The first floor consists of a large hall capable of holding about 300 people, with a retiring-room attached, and a cloak room. There are accesses to this hall from both roads.

The large hall has an open timber roof, the boarding left white, the rafters, &c., stained walnut and varnished; it also has a dado of brown glazed tiles; the walls will be of brown buff, and the other woodwork is sage green. The glazing above the transoms is in lead lights of pale cathedral glass with ruby borders.

The public rooms and vestibules are heated by hot-water pipes.

Externally the building is of stock bricks, relieved in parts with red brick; the strings, cornices and other drawings are of box ground stone. The roofs are of green slates.

The cost of the building has been about 2,200*l.* The contractors were Messrs. Foster & Dicksee, of Rugby and London. The architect was Mr. Edwin T. Hall.

Kitwell's Park, Herts.—Extensive alterations have just been completed at Kitwells Park, Shenley, Herts. The hall has been altered and rearranged in Jacobean style, with new staircase, columns, dado, chimney-piece, and ceiling beams, all in oak, from designs by Mr. Reginald Pinder, F.R.I.B.A. New parquet floors have been laid down by Arrowsmith in the reception-rooms and hall, and the old fire-places fitted with Pridgeon Teale, and Nautilus grates, and oak Jacobean mantels. All sanitary fittings and baths of the most modern kinds have been put in, and the drains re-arranged on the disconnected and separately-ventilated system, Doulton's patent jointed pipes being used. The stables and model farm (including cow-houses, pigstyes, and poultry-pens) have also been fitted with the best modern appliances. Messrs. Boff Brothers, of St. Albans, has the contract for the work at the house, and Mr. Carter, of Shenley, that for the farm and stables.

CAMPANILE AT VARESE.

THIS is a sketch of the campanile which

Campanile, Varese.

dominates all other buildings in the old silk manufacturing town of Varese, a few miles from Lake Como. T. E. KNIGHTLEY.

THE BRITISH SCHOOL AT ATHENS.

THE first open meeting of the session was held in the library of the School on the afternoon of Jan. 1. The Director, Mr. Ernest Gardner, made a few preliminary remarks on the prospects of the School for the ensuing season. He said that the Committee had offered an exhibition of 50*l.* at each of the two Universities for the purpose of sending out students to work in Athens for a period of not less than three months; that a scholarship had been established in connexion with the School by

Magdalen College, Oxford; and that a special fund was being got together for the purpose of making a complete collection of drawings and studies of the remains of Byzantine architecture in Greece proper. He also mentioned that the surplus of the Newton Testimonial had been handed over to the School as a reserve fund, and that out of this considerable additions were being made to the collection of books in the library. Three students were already in residence, and four others were expected very shortly. In addition to these, two more were on their way to Cyprus to commence excavations on the important site of Salamis, on that island. Excavations would also be conducted this session by the School on Greek soil for the first time. The exact site had not been definitely fixed on, but negotiations were in progress.

Mr. Gardner then read a short paper on a fragment of a sepulchral stele in the museum at Argos, representing the head of a boy smiling, the date of which is fixed by the character of the inscription as fourth century B.C. He compared this head with that of a somewhat older boy found at Papho, in Cyprus, during the excavations carried on there the season before last under his superintendence, and he argued from the striking resemblance between the two heads, that the Papho one belonged also to the fourth century B.C., and not, as some archæologists asserted, to the Hellenistic age.

Mr. H. A. Tubbs afterwards gave an interesting account of the excavations undertaken last spring at Poli, in Cyprus, by members of the School, under the auspices of the Cyprus Exploration Fund. These excavations were principally confined to tombs, and Mr. Tubbs described in detail the different varieties of the tombs opened, and their various characteristics. He mentioned that this site had previously been worked on to some extent by a private syndicate, and that Dr. Herrmann, of Berlin, had written a brochure on the subject. He criticised Dr. Herrmann's classification of these tombs according to the various forms of the δρομος, or approach, regarding these as no certain indication of date. He also pointed out the difficulty of classifying according to the articles found, and showed that the same tombs had been used and re-used at different periods.

Mr. Tubbs then proceeded to describe the pottery found in the excavations, the most distinctive form of which was the black ware, with raised ornamentation. As to the pottery generally, he showed the persistency of types, and the consequent difficulty of dating particular specimens. A detailed report of these excavations will shortly appear in the *Journal of Hellenic Studies*.

These meetings of the School will be held at intervals during the session, and, in addition, the Director proposes lecturing to the students in the museums and elsewhere.

THE ROYAL ACADEMY:

ADMISSIONS TO THE ARCHITECTURAL SCHOOL.

MR. R. PHENÉ SPIERS, F.R.I.B.A., the Master of the Architectural School of the Royal Academy, sends us the following list of students admitted this month, viz.:—

Upper School.

A. E. Bartlett.	C. H. Norton.
B. F. Fletcher.	

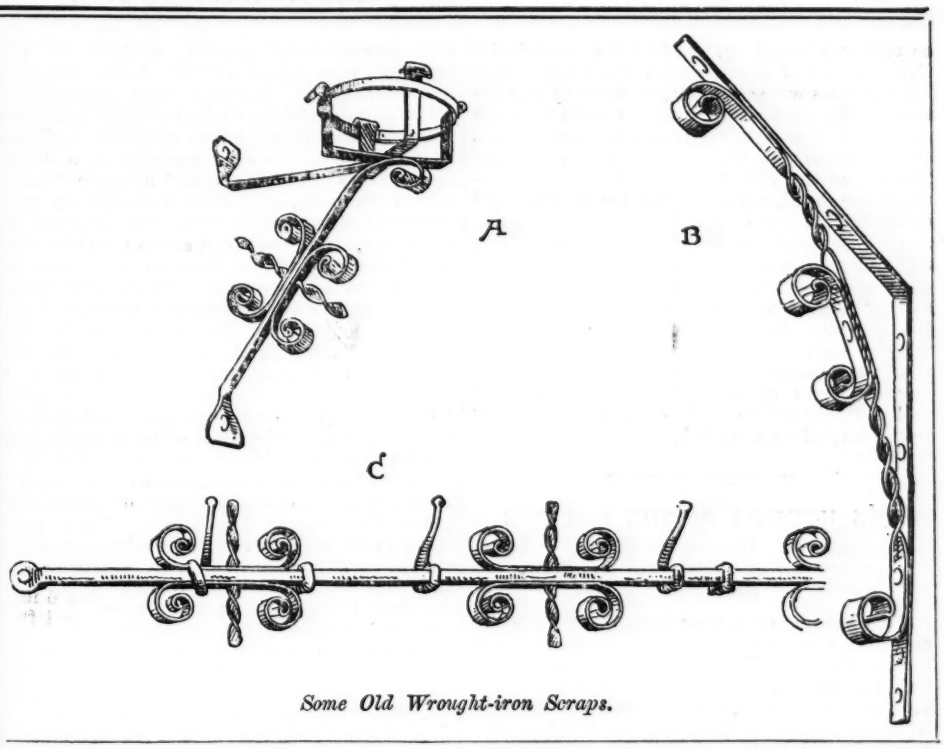
Lower School.

C. W. Baker.	R. A. Reid.
C. Bywater.	P. D. Smith.
A. J. Edwards.	J. S. Stewart.
E. Gibson.	G. Streatfeild.
S. M. Herbert.	H. Tooley.
H. L. Paterson.	A. B. Yeates.

Probationers.

H. P. Adams.	C. Evans.
W. E. Barry.	F. Fellowes.
John Begg.	D. B. Niven.
D. Blow.	F. Rhoades.
J. Borrowman.	A. Dunbar Smith.
A. W. Cleaver.	D. C. Veazey.
J. B. Ellison.	H. H. Wigglesworth.

The Institution of Civil Engineers.—A new edition of the list of members of the Institution of Civil Engineers, corrected to the 2nd inst., being the seventy-second anniversary of its establishment, has just been prepared, from which it appears that the aggregate number of members of all classes is 5,804.



Some Old Wrought-iron Scraps.

SOME OLD WROUGHT-IRON SCRAPS.

OF the accompanying blocks, A is one of the very few remaining hour-glass holders. It is preserved in Wisley Church, Surrey. Its form should make it applicable to many purposes.

B is a bracket, of the same period, from Effingham Church, Surrey, and C is a hat-rail from the old church at Esher.

ELECTRIC WELDING.

THE electric welding of metals is a very perfect and reliable process. It can be now seen in operation at the small show works of the Electric Welding Syndicate at Hoxton. A display of the process as an experimental illustration was made at Professor Ayrton's lecture at Bath, on the occasion of the British Association meeting about eighteen months ago in that ancient city. The process was also investigated at the Paris Exhibition, and has been a subject of discussion at the Iron and Steel Institute. Prominence was first given to it by Professor Elihu Thomson, at New York, in 1887. The correlation of the physical forces—so concisely and ably elucidated many years ago by Sir William Grove, and which remains one of the brightest accomplishments of that eminent scientist's numerous labours—receives in electric welding one of its most recent and practical illustrations. In the factory at Hoxton, the visitor will see before him the furnace, the boiler, the steam-engine, the dynamo, the copper conductor, the "converter," and the massive copper clamps for holding the bars, pipes, or wires to be welded. Combustion or chemical change in the fuel produces heat: the heat is converted by the steam-engine into motion, the belt conveys this motion to the dynamo, and the revolution of the armature within its magnets converts that motion into electricity, and the current flows along the conductor until it meets with resistance at the intervals where the pieces of metal are placed for welding, and there the electricity is changed into heat. Thus, before our eyes we have the fifty horse-power of the engine converted into most intense local heat and fusing the contiguous surfaces of the two pieces of metal to be welded, so that by mechanically pressing them together they firmly adhere, and a weld surpassing anything the best smith could accomplish is performed in the interval of a few seconds of time.

How this wonderful transformation? To employ a vast current at a very low tension direct would be unprofitable, because the current could not easily be carried to any sufficient distance for handy application with large and costly conductors. To generate at the dynamo machine a current of high tension easily transmissible by a small conductor to long distances, and to convert that tension into quantity when it has arrived at its destination by a "converter," is the plan of the method. Everybody knows the Ruhmkoff coil by the little toy instruments so very common. The "induction coil," as it is more generally known, has an iron core with a coil of covered copper wire round it. A small primary current of electricity at low tension magnetises the iron core, causing the emission in long sparks of a secondary current induced through the copper coil. If the construction of this induction coil were inverted, the high tension current received by such an instrument would be transformed into a quantity current at very low tension.

In the Hoxton works the electrical current leaves the dynamo at a maximum potential of 300 volts. But when the current reaches the "converter" it is transformed into a quantity current of perhaps some 4,000 ampères, at a potential of only 3 or 4 volts. The interruption of such a current produces enormous heat over a small locality where it is wanted for the work to be done, leaving the current in its changed condition harmless to life, although the electrical energy will probably be at the place of welding nothing under a total of 40,000 watts. By unseen correlations of physical forces, the whole work of that steam-engine is brought to bear upon the weld required to be made in a bar of steel 1 in. in diameter, an iron pipe 3 in. across, or a bar of platinum ½ square inch in section.

By the introduction of a resistance grating the induced current can be modified in power to any extent, so that a metal which melts at 160 deg. of temperature can be as properly brought to its fusion-point, or welding-heat, as another metal requiring 3,000 or more degrees of heat for effecting the like purposes.

In this way the welding of many metals hitherto deemed intractable has been effected, or has become possible. Not only can wrought iron, hard steel, brass, lead, tin, platinum, gold, and cast-iron be welded, but different metals may be actually joined together.

Taking a practical view of electric welding, we have these important advantages:—The welding operation can be seen, and the weld is perfectly clean. The metal is not, as in ordinary smith's work, covered up by coal, with all the attendant risks of cinders getting into the weld; there is an absolute control over the heat as well as over the operation; the homogeneity of the metal, alike in the weld and in the mass of the article, is the same; and, finally, the rapidity and accuracy of execution.

Out of the numerous experiments we have witnessed, two were singularly noticeable,—the welding of a colliery steel-wire rope, and an excellent example of plate rivetting. In the former case, each of the two ends of the wire-rope were bound on an iron ferrule, and then the ends of the rope were filed quite smooth. They were then secured in position by the copper clamps and the current turned on. A perfect weld was speedily effected and the iron ferrules were knocked away.

In the rivetting quarter two inch-plates were placed properly together, and a cold rivet-blank put through the two contiguous holes. The

current was turned on, and in a few seconds the rivet-blank was glowing with white heat. The head-moulds were then pushed forward and the rivet-heads pressed up on both ends with the most perfect results. Afterwards, when it was attempted to cut the rivet-head away, it was found that the chisel could not be got underneath the head, the under-surface of the head being welded down upon the flat of the plate, and consequently only a clean cut of the head right through could get it away.

At the present time we cannot speak with any accuracy as to the commercial cost of the process, but, without doubt, its value will be such for a great number of purpcses that the advantages of its use will outbalance any questions of additional cost,—and these will probably not be such as really would stand in the way of its adoption.

THE HOUSING OF THE WORKING CLASSES:

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

THE housing of the working classes was the subject of a paper entitled "Human Homes for the Poor," read at the monthly meeting of this Association, held on Saturday, the 4th inst. at Carpenters' Hall, London-wall, by the Rev. A. Robins, rector of Holy Trinity, Windsor, who has suffered a little martyrdom in consequence of his denunciation of certain Windsor tenements which are unfit for human habitation. The Chairman of the Council, Mr. Hugh Alexander, presided, and there was a large attendance, and in reply to invitations sent to the President of the Local Government Board, Lord Cross, the Earl of Aberdeen, and other prominent sanitarians, letters of regret were received. Mr. Ritchie wrote expressing pleasure that the question of better provision for the housing of the working classes was to be considered, because it was desirable that strong and sound public opinion should be formed in order that full effect might be given to the representations made in his recent circular to local authorities.

In spite of Royal Commissions, as the paper pointed out, and the appeals of philanthropists, the teachings of sanitary reformers, and the public indignation roused from time to time by such revelations as those of "The Bitter Cry,"* the horrible moral cesspools in which scores of thousands of human beings lived in London and various great towns, no corresponding action had been taken by the governing authorities to remedy the evil. The time had come when the nation must be told,—the State and the Church, too, must be told,—that to continue to neglect the question was to be guilty of "criminal indifference." If it was right to confiscate meat offered in the market when it was found unfit for human food, it ought to be considered justifiable to confiscate houses when they were found unfit for human habitation, ugly as the word "confiscation" might be. Statesmen of all shades of politics had followed the sanitary reformers and the philanthropists in their denunciations. It was evident that horses, dogs, and cattle were better housed than their human attendants, that moral advancement was impossible, and that even the physical and mental stamina of the nation were endangered by the existing condition of things, and yet even the boldest seemed to touch the question with timidity. Why? A parson who ventured to cry out louder than his fellows got burned in effigy, and most men who came face to face with the evil became demoralised, paralysed, and dazed, on beholding its magnitude, and on becoming conscious of the fact that so many men, already rich and powerful, made profit and lucre out of the very horrors of the situation.

In dealing with the gigantic evils of the slums, powers not merely permissive but compulsory must be put into the hands of the proper officials, and the hands of these authorities must be fortified and strengthened. Too many vestrymen and municipal councillors were interested in the continuance of the evil for this power of initiating reforms to be longer left in the hands of such bodies. Before all else, the State must review, revise, and consolidate all Acts dealing with the Public Health, creating the sanitary inspectors officers of the State, and delegating to such officers, not discretionary powers, subject to the pleasure and approval of local Sanitary Authorities, or Vestries, but compulsory, peremptory authority to deal with all insanitary areas. A consolidated and amended Act must declare and define what constituted a house, and what a "human home" must be, what it should comprise, and what it should not comprehend. They would then have Imperial instructions, and such compulsory powers conferred as would enable them to carry them out with effect and authority. Facts with regard to the condition of insanitary houses at Windsor, vouched for by the reports of Dr. Airy and Dr. Taylor, and at Durham by Drs. Vance and Jephson, were adduced to show that while Mr. Ritchie said all the mischief resulted from the halting, hesitating, and unsatisfactory administration of local authorities, the latter retorted that they had no power to do what had been recommended by the Imperial authorities. Such a conflict of authorities must be rendered impossible. They must insist upon the substitution of the compulsory for the permissive principle, and the consolidation of all the Public Health Acts. All Medical Officers of Health must be Her Majesty's Medical Officers of Health, appointed to, and set over a city, or a town, or a district, and that they might be thoroughly disinterested, impartial, and independent, they should be disqualified from taking any private practice.

Such benefactions as that of Sir E. Guinness, noble and munificent as they were, would prove but a drop in the ocean. A question of such infinite magnitude as "the housing of the poor" could only be effectively dealt with by the State. The ways and means, through advances and loans at low interest, could be provided by the State without difficulty, and only the State could solve the difficulty.

In concluding his paper, the Rev. Mr. Robins said:—"A vast proportion of the dwellings of the poor are morally, socially, and physically slaughter-houses. What are they but shambles, for does not depravity destroy our poor within them hourly, and slay them day by day? A distinguished member of Parliament, who has himself a Bill before the House of Commons, wrote to me on Dec. 10 as follows:—'The present state of things is deplorable, and I must say I am not in any way satisfied with Mr. Ritchie's last circular. The real question remains: What is to be done with a Local Authority that will not perform its legitimate duties?' The only possible answer to that question is,—and I desire to set it before you with all the emphasis at my command,—all Medical Officers of Health and Sanitary Inspectors must be responsible only to the Local Government Board, and free of the control of municipalities and vestries, and the powers with which you are invested must be compulsory powers."

As an appendix to the paper, plans were attached of workmen's dwellings designed by Messrs. Knill Freeman & Robins, Newcastle-on-Tyne, with estimates for houses which would be in all respects "human homes," and another appendix contained suggestions by Mr. Stephen Wyborn, architect and surveyor, Windsor, with regard to the necessary improvements in that town. The proposed "homes" are of three types, costing respectively 220*l*., 200*l*., 150*l*., and 135*l*., according to the estimates of a local builder.

A discussion followed the reading of the paper, in which the Chairman, Mr. Sheffield (Poplar Board of Works), Mr. Mellonds (Windsor), Mr. E. C. Robins, F.R.I.B.A., and other gentlemen, took part. Mr. Mellonds said it was not quite correct to assert that nothing had been done at South-place, Windsor, to remedy the defects complained of. Besides much repairing and cleaning, ventilators had been inserted in the back walls of the rooms, and the tenants had shown their appreciation of this improvement by stopping them up. In summing up the discussion, Mr. Alexander, the Chairman, said a radical cure for the evils pointed out in the paper could only be obtained by an alteration of the Land Laws, by abolishing leaseholds, prohibiting the erection of dwellings with less than 20 ft. frontages, and prescribing that, where there were two rooms in depth, they should measure, from front to back, at least as much as from side to side. Every home, too, should have an open yard with an area at least equal to half that on which the house was built. The proceedings concluded by according to the reverend lecturer a vote of thanks.

* Long antecedent to which, however, were the revelations made in the *Builder*, by the late Mr. George Godwin.—ED.

THE REGISTRATION OF PLUMBERS.

THE Registration Committee of the Worshipful Company of Plumbers, on the invitation of the Court, dined together at Cannon-street Hotel on the 2nd inst. The Master of the Company (Mr. W. H. Bishop), Mr. Philip Wilkinson (Renter Warden), Mr. F. Machin, Mr. Alderman and Sheriff Stuart Knill (Past Masters), and Mr. John Smeaton (Assistant), represented the Court.

The Master, in the course of his speech welcoming the Committee and reviewing their work of the past year, stated that the work of the examiners was heavier in 1889 than in any previous year by two-thirds. He referred to the necessity for specifying plumbers' work separately in building contracts, and making plumbers responsible for the sanitary efficiency of the whole of their work, from the roof to the main sewer.

Mr. G. Clegg, master plumber, in responding to the toast of "The Registration Committee," referred to the influence of the registration movement on the technical education of plumbers as "the grandest feature of the movement." He suggested that periodical exhibitions of work executed by apprentice plumbers and others should be held under the auspices of the Plumbers' Company.

Mr. L. F. Gilbert, operative plumber, expressed the growing confidence of himself and his fellow-workmen in the advantages which must accrue to the trade from the registration movement, and suggested that a special committee should be appointed to extend the working of the system in Western London.

Mr. Machin, Past Master, in proposing the toast of "The Examiners," referred to the responsible character of the work of the provincial as well as the metropolitan Boards of Examiners, and its interest for the inhabitants of the whole kingdom.

Mr. John Smeaton, master plumber, in replying, referred to the recent examinations he had attended at Dublin and Liverpool, remarking that he considered the work of the candidates was fully equal to the average in London, and that some of the specimens of modern plumbing work he had seen in Dublin were of a most superior character. He approved the suggestion of holding periodical exhibitions of plumbers' work as tending to create healthy emulation among the members of the craft, and he referred to the considerable cost which this and the further development of the Company's educational system would necessarily involve.

Mr. W. H. Webb, master plumber, said the older men in the trade were encouraging the younger men to present themselves for the Company's Examinations.

Mr. R. J. Lyne, operative plumber, said the Dublin members of the United Operative Plumbers' Association were heartily in accord with the examination system, and that they considered it was the only means of protecting the public against "botchers."

Mr. Wilkinson, Renter Warden, in proposing the toast, "The Teachers of Technical and Scientific Plumbing," referred to the report made by Mr. Lyne on the exhibits of plumbers' work in the Paris Exhibition, and the extension of technical education among French plumbers.

Mr. J. W. Clarke, foreman plumber, said the Plumbing Classes at the Polytechnic were making steady progress, and he found that the prizes offered by the Plumbers' Company acted as a considerable incentive to the students. He announced that additional money prizes had been offered by Mr. Titmas, Mr. Clegg, Mr. Hume, Mr. John Smeaton, and Mr. Bostel. He laid much stress on the importance of free-hand and mechanical drawing being taught in Plumbers' Classes.

Mr. Millis, Superintendent of the Trade Classes at the Finsbury and Westminster Institutes, said they found a great impetus had been given to the whole of the trade classes at the Institutions by the action of the Plumbers' Company in promoting classes for plumbers. He pointed out that it was necessary to have separate classes for adult plumbers, mentioning that a class of the kind was held at Westminster. He referred to the course of lectures on Technical Education, specially suited to plumbers, delivered in Dublin, and recommended similar lectures being delivered in other parts of the Kingdom.

Mr. Browning, Teacher of Plumbing Classes at Chelsea, Lambeth, and Clapham, said the practical work of the students was better in the

last session than in any previous one. He recommended mutual improvement classes for adult plumbers, who would be both interested and benefited by practical discussions on the details of their trade.

A letter was read from Mr. Emptage, master plumber, of Margate, regretting that he was prevented by illness from being present, and congratulating the Plumbers' Company and the Registration Committee on the growing interest of the public in sanitary matters, and the hearty support which is being accorded to the registration movement by the trade and the public in all parts of the kingdom.

ARCHITECTURAL SOCIETIES.

The Royal Institute of British Architects.—A special general meeting of this Institute (for members only) will be held on Monday next, Jan. 13, to consider a recommendation of the Council, that the form and alternative form of Articles of Pupilage, submitted to the annual general meeting held on May 6, 1889, be printed and published as an Institute Paper, with this modification — that in place of the word "Architect," as descriptive of the "Principal," a blank be left which may be filled in with the words "Architect" or "Architect and Surveyor," as the party or parties may please; and that a note to this effect be printed in the margin against each of the three places in which the word "Architect" appears in each form. On the same evening, at the close of the meeting above-mentioned, a business general meeting (for members only) will be held for the following purposes:—To read the minutes of the ordinary general meeting held on Dec. 16, 1889; to announce donations of books, &c.; to formally admit members attending for the first time since their election; to ballot for candidates who desire to be admitted as Fellows; to elect, under the terms of by-law 9 (*b*) candidates who desire to be admitted as Associates; to receive the announcement of the award of the studentships and prizes for 1889–90, made by the Council (in accordance with the terms of By-law 66) in writing under the common seal; and, on the motion of Mr. Wm. Woodward, Associate, to consider the "Sundry Powers and Provisions" portion of the London Council (General Powers) Bill. A public exhibition of all the designs, drawings, sketches, &c., submitted for the studentships, medals, and other prizes, 1889-90, will be held in the larger Conduit-street Gallery daily, until Monday, the 20th inst., at 10 p.m.—the Exhibition meanwhile opening at 10 a.m. and closing at 9 p.m. every day. The drawings and sketches made by the Soane Medallist 1888, the Owen-Jones Travelling Student, 1889, and the Pugin Travelling Student, 1889, will also be on view during the same period.

The Architectural Association.—The sixth meeting of this Association for the present session was held on Friday, the 3rd inst., in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. T. E. Pryce (Vice-President) in the chair. The following gentlemen were elected members, viz.:—Messrs. G. Stephenson, J. H. Mann, P. Field, P. P. C. Smith, A. E. Seaman, T. Parker, and W. Stewart. Mr. Sydney B. Beale then read a paper on "Spires, Towers, and Domes," the first part of which we print on another page.

Birmingham Architectural Association.—At a meeting of this Association, held on Tuesday evening last, Jan. 7, Mr. W. H. Lloyd, Vice-President, being in the chair, a paper was read by Mr. F. B. Andrews, A.R.I.B.A., on Pershore Abbey. The paper was rendered of special interest by the very full manner in which it was illustrated by drawings and photos. Of the history of the Abbey, Mr. Andrews said that much was veiled in obscurity, owing greatly to the fact that fires had been of frequent occurrence in the Abbey, destroying, with much else of value, the record of its early years. Various authorities fixed the date of its foundation in 604, 681, 689 A.D., and other dates in the seventh century, of which 618 seemed that most probably correct. It was at first dedicated to SS. Mary, Peter, and Paul, and given to the secular canons, but finally became the Benedictine Abbey of SS. Mary and Edburga. Records are found of its restorations after fires in the years 1020, 1056, 1102, 1223, 1288, the fire in the last-named year reducing nearly the whole abbey to ashes, together with the town of which it was the central building. The remains at present existing are the choir, choir aisles, south transept and transept tower, and two small chapels north and south of the choir, and sufficient remains of the foundations have been traced to define the form of the Lady Chapel, nave, north transept, cloisters, Abbot's lodge, fratry, common room, and chapter-house. The south transept, built a few years before the Conquest, is the earliest part of the remains, and the nave and lower part of the tower are of the eleventh century, the Lady Chapel of the thirteenth century, and the lantern and belfry stages of the tower of the fourteenth century. The south transept has a small vault of fourteenth century work, bearing amongst others the arms and rebus of Abbot Newton, 1413-1456. The choir has a semi-hexagonal plan at the east end, though the surrounding ambulatory and the Lady Chapel appear to have been square on plan. The tower is of special interest, from the very marked resemblance, pointed out by the late Sir Gilbert Scott, which it bears to the tower of Salisbury Cathedral, for though comparatively simple in its detail, the belfry stage is throughout a plainer version of the first stage of the fourteenth-century work in the Salisbury tower, and the lantern is an absolute translation into the later work of the thirteenth-century lantern at Salisbury. "The details," says Sir G. Scott, "bear considerable resemblance, the distribution of windows, blanks, and piers is absolutely identical, and so also are the very remarkable bands, quatrefoils, &c. While speaking, however, of the details as being simplified from those at Salisbury, I must except the internal features of the lantern . . . they are far richer and more beautiful; indeed, I scarcely know of a lantern story so beautiful, and it stands, as far as I know, quite alone in its design." In conclusion, Mr. Andrews mentioned the many interesting buildings which surround Pershore, and which, with the Abbey, make the neighbourhood of singular interest to the architect. A hearty vote of thanks was accorded to Mr. Andrews, on the motion of the Chairman, supported by Messrs. Cotton, Doubleday, Bidlake, and H. R. Lloyd.

Liverpool Architectural Society.—The fourth ordinary meeting of the Liverpool Architectural Society was held on Monday evening last, January 6th, the President (Mr. T. Mellard Reade) in the chair. A paper was read by Mr. James L. Thornely entitled "Monumental brasses," with special reference to those of Lancashire and Cheshire. The lecturer, who exhibited a fine collection of rubbings, began his paper by defining a monumental brass, so far as dealt with on this occasion, as a figure or effigy engraved on a brass plate with or without accompanying canopies, inscriptions, or other ornaments, and proceeded to class the examples roughly under five periods, and dealt briefly with the leading characteristics of each, illustrating his remarks by numerous heelball rubbings, which comprised a fairly representative collection of brasses of ecclesiastics, knights, ladies, and civilians. He also pointed out that the early brasses (many of them of Flemish manufacture) were much larger and more bold and free in design than the later, and mentioned that after the introduction of shading by means of cross lines, the vigour and worth of the brasses gradually declined. He further alluded to the former practice of enamelling the brasses, to represent the colouring of heraldic bearings, &c., thereby greatly enhancing them in richness of effect; also to the handsome canopies to be met with in many examples; he pointed out that the various Norman Gothic styles and their transitions can clearly be traced in these portions of the brasses. Mr. Thornely further referred to the curious but discreditable practice of making palimpsest brasses, *i.e.*, reversing an old brass and utilising it to commemorate a subsequent deceased person. He further referred to the devices or marks to be met with upon some brasses indicating the private or company trade-mark of the engraver, and pointed out that companies or fellowships of brass-workers used to exist. In conclusion, after calling attention to the scarcity of brasses in Lancashire and Cheshire, compared with the southern and eastern parts of England, the lecturer referred to rubbings of the following local brasses:—In Cheshire: Sir Robers del Bothe and Lady Dulcie, his wife, at Wilmslow; Roger Legh and children, Macclesfield; and a civilian from St. Peter's Church, Chester. In Lancashire: Piers Gerard, and Sir Peter Leger and his lady, at Winwick, near Warrington; a knight of the Scarisbrick family, Ormskirk; Ralph Catteral, wife and children, from Whalley; Henry Norris, and Clemence his wife, from Childwall, near Liverpool; and Thomas Beri, from Walton-on-the-Hill.

"A QUESTION OF DISTRICT SURVEYOR'S FEES."

HAYWARD *v.* SANDON BROTHERS.

IT will be remembered that in this case Mr. C. F. Hayward, District Surveyor of St. George's and St. Giles's Bloomsbury, sued Messrs. Sandon Bros. to recover an amount of £56. 5s. as fees due to him as District Surveyor upon the erection of the above premises, which consist of four shops and two sets of chambers on the ground-floor, one set of chambers and box-rooms on the basement-floor, and eight sets of chambers on the upper floors, all the latter approached through one entrance, and having one staircase, and being let as separate tenements.

When the matter was brought before Mr. Bridge at Bow-street, on October 4, 1889, he decided in favour of the District Surveyor, upon which Mr. Edward Morten, counsel for the defendants, gave notice of appeal, as his contention and that of Mr. W. Seckham Witherington, defendant's architect, was that sec. 27, rules 1, 2, and 3, applied only as to the "separation of buildings and the limitation of their areas," and not to fees which are settled under sec. 49, schedule 2, part 1, as not to exceed £10. Leave to appeal was given, and Mr. Bridge suggested that Mr. Morten should draw the case, and when approved by Mr. Hayward it should be submitted to him for signature.

When, however, the parties appeared before Mr. Bridge, Mr. Hayward claimed his fees under sec. 27, rule 2; but his solicitor, in approving the case, inserted also rules 1 and 3. Mr. Bridge objected to rules 1 and 3 being mentioned, unless facts could be argued showing what sum Mr. Hayward would be entitled to if rule 3 applied to the question of fees. These could not be arranged, and Mr. Morten pressed the magistrate to state the case under rule 2.

Eventually the magistrate declined to state any case, and the summons was dismissed, Mr. Hayward's solicitor advising him not to take one under rule 2.

No order as to costs was made.—*Communicated.*

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.

SIR,—At the adjourned meeting held on December 21, 1889, the following resolution was passed, and afterwards referred to the Council for consideration:—"That the Council of the Royal Institute of British Architects be asked to define the present status of the Sanitary Inspector; and, having regard to the obvious intentions of the Sanitary Acts of Parliament, the experience of their working since acquired, and the duties actually devolving upon such officers, to further define what ought to be the qualifications of candidates for the said office." The Council are of opinion that the step proposed to be taken by that resolution is an important one, and that such a course should only be taken if approved of by a majority of the members of the Association and its branches, and, therefore, measures are being taken to obtain that opinion. The Council also will be pleased to receive observations thereon from any Sanitary Inspector, though he may not be in membership, as it is upon a matter which equally concerns all Sanitary Inspectors.

SAMUEL C. LEGG, Hon. Sec.

January 8, 1890.

THE MONTROSE MONUMENT.

SIR,—In the notice of the Montrose Memorial, illustrated in your issue of the 4th inst., after stating that Messrs. J. and W. B. Rhind are the sculptors of the monument, you make what seems to me a most unnecessary remark, viz., "so we are informed, though we do not well understand how two sculptors can be joint artists of one figure." My son, W. Birnie Rhind, I have trained as a sculptor, and for the last ten years he has been associated with me in many of my principal works, in addition to what he has been commissioned to execute in his own name. If it is possible for two architects jointly to design a work of art in the shape of a public building, why may not two sculptors combine their efforts in executing a public memorial?

JOHN RHIND.

*** Partnership in architectural work is not by any means a parallel case. As far as pure design in architecture is concerned, we should say the same as of sculpture—it must be the work of one mind; but the carrying out of a building includes a great many other things—arrangement of plan, details of construction, warming and ventilation, which one

partner may elaborate separately. A partnership association in such a thing as a work of sculpture would appear to many, as it does to us, to savour more of art-manufacture than of art.—ED.

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—II.

MAGNETS.

A MAGNET possesses two characteristic properties: (1) if suspended at the earth's surface, so as to turn freely about a vertical axis, it will in general tend to set itself in a certain azimuth, and if disturbed from this position will oscillate about it; (2) it will attract certain substances: iron, steel, lodestone, and nickel among others.

Any substance capable of being attracted by a magnet is called a magnetic substance. All magnets are made of magnetic substances, but all magnetic substances are not capable of becoming permanent magnets; if they are, some, at least, form exceedingly feeble ones. Although magnets may be made of any shape and of a variety of substances, in practice they are made from rods of hardened steel in the form of a bar or bent into the shape of a horse-shoe.

The force of attraction of a magnet varies greatly at different points of its surface. It is greatest near the ends, and sinks to zero at the centre of a uniformly-magnetised rod. The points on a magnet where the attractive power ceases are called its *neutral* points. Near the ends of a magnet where the attraction is greatest, the force seems to spring from two points, called the *poles* of the magnet.

When dealing with problems concerned with gravitation,—that is, the attraction of one piece of matter for another,—it is frequently useful to conceive the whole of the matter in a body concentrated at one single point. A sphere, for instance, attracts bodies placed outside it precisely as though the whole of its mass had been concentrated at its centre. This point is simply a centre of forces, and, as such, is of enormous importance mathematically, but physically the centre point of the sphere differs in no way from any other point in it.

The poles of a magnet are nothing more than centres of magnetic force, and differ physically in no way from other points in the steel throughout the mass of the magnet. At the same time it is frequently useful to speak as though all the magnetism of magnets, whatever magnetism may be, were concentrated at these two points, and the steel rod merely served as a metal framework holding these two points of magnetism.

It is of importance to call attention to this at the outset, as the poles are so often referred to that students are apt to get in the habit of thinking that the constitution of a magnet at its poles differs from its constitution at any other point.

It is a line joining the poles of a magnet, called the *axis*, which points magnetic north and south, a direction which is in London some 18 deg. west of true north, called the *declination* of the compass-needle. The end of the magnet which points to the earth's north pole will be called the north end, and the end which points to the earth's south pole, the south end, the poles of the magnet being respectively called north and south. The facts that the two poles of a magnet are equal in strength and that like poles repel each other while unlike poles attract, besides many other points of similarity between magnetic and electrical effects, led early investigators to suggest fluid theories of magnetism similar to the old fluid theories of electricity. The probable nature of magnetism will be explained in a future article, for the present it is enough to state that there are no sufficient grounds for believing in the existence of magnetic fluids. On the contrary, there is every reason to believe that such fluids do not exist.

If a magnet is broken into any number of pieces, or even ground to powder, each little fragment is a complete magnet with two equal poles, and possesses all the properties of larger magnets. This has led to the belief that each molecule of the substance of which a magnet is composed is a complete little magnet, and that the various effects produced by a magnet, as a whole, are due to *arrangement* of these molecular magnets.

The experiments of Professor Hughes, published in 1883, have done much to confirm this belief, and to show the various arrangements the molecules of a magnetic substance can be made to assume under suitable treatment. When a piece of iron or steel is in an unmagnetised state, the molecules are, nevertheless, magnetised, and arrange themselves in closed polygons (fig. 2), the north pole of one molecule

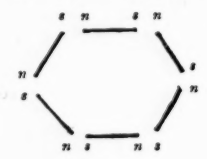


Fig. 2.

sticking to the south pole of the next, and thus neutralising each other's external effects.

Fig. 3.

When the metal is magnetised, a certain number of the closed polygons, fig. 2, split up, and the molecules place themselves end to end, fig. 3, the north poles all facing one way, the south poles in the other direction. Fig. 3 shows also how the unneutralised north poles of the molecular magnets form the N pole of the magnet as a whole, and make it appear that magnetism is concentrated at the pole of the magnet, the same, of course, applying to the S pole. Coercive force, the power which enables a magnetic substance to become a permanent magnet, depends upon the degree of freedom with which its molecules can turn. A magnetic substance under external magnetic influences may have a certain proportion of its molecules arranged as in fig. 3, when the external influence is withdrawn, they will tend to re-arrange themselves as in fig. 2, and whether they will do so or not,—that is to say, whether the substance will cease to be magnetised or not,—depends upon the ease or difficulty with which the molecules can turn. In soft iron the coercive force is excessively small; it can therefore be magnetised very easily, but cannot unaided remain a magnet. In steel, on the other hand, coercive force is great; it is harder to magnetise, but, when once magnetised, the molecules retain their positions, and a permanent magnet is the result.

The quantity of a thing can always be measured by measuring the quantity of some effect it produces, without necessarily knowing the precise nature of the thing measured.

If the poles of two magnets are presented to each other there is attraction or repulsion, and this effect is made use of for defining what is meant by a "pole of unit strength," or "a unit pole." *Unit magnetic pole* is that pole which, placed at a distance of one centimeter from a similar and equal pole, repels it with a force of one dyne.* Coulomb showed that the force between two magnetic poles varies directly as the product of their strengths and inversely as the square of the distance between them. Hence, by the above definition, if m_1, m_2 are the strengths of two poles, d the distance between them in centimeters, and F the force acting in dynes:—

$$F = \frac{m_1 m_2}{d^2}$$

Although it is impossible to get, say, a north pole without a south pole, the south pole may be moved off to as great a distance as we please by making the magnet long enough. We shall frequently, therefore, speak of a north pole as though it could have a separate existence.

If a movable pole is put anywhere in the region round a magnet, it experiences a force urging it in some direction. Each of the poles of the magnet acts on the movable pole with a certain force, and the direction of the resultant of these two forces is the direction in which the pole is urged.

If the pole is allowed to move, it will trace out a "line of force." *A line of force* is, therefore, a line such that its direction at any point is the direction of the resultant force at that point. In the present case, magnetic lines of force are meant, dealing with the force produced on a magnetic pole as such; but the definition will, of course, apply to *force*, no matter how produced, nor on what it acts. Now since the movable pole, unless screened in some way from the action of the magnet, experiences force wherever it is put in the region round it, this space must be filled with "lines of force"; such a region is called a "field of force." *A field of force* consists of an infinite number of lines of force. The positive direction, or simply direction, of a line of force is the direction along it in which a north pole would move.

If the direction of a line of force at any one point is required, it can be found by freely suspending a little magnetic needle at that point, when it will lie along the line of force passing through it.

Lines of force can almost be said to be made visible by means of iron filings. If a card be placed over a magnet, or in any field of force, and filings shaken from a muslin-bag on to it, the filings become magnetised in the directions of lines of force, and stick together end to end so as to trace out the contour of the field. A few of the beautiful figures so easily obtained in this way will give students an idea of the distribution of lines of force around magnets and systems of magnets that no mere explanations can ever convey.

* If a force of one dyne acts in the same direction on a mass of one gramme for one second, it produces in it a velocity of one centimeter per second

Books.

A History of Warwickshire. By SAM. TIMMINS, F.S.A. Elliot Stock.

SIR WILLIAM DUGDALE'S history of

"That shire,
Which we the heart of England well may call,'

is not to be found on many bookshelves, and even when found will not supply all that the modern reader requires. To begin with, it is nearly two-and-a-half centuries old; and, though the edition published by Dr. Thomas in 1730 contains some additions and corrections, we shall look in vain therein for anything but ancient history. The development of Birmingham belongs chiefly to the latter half of the last century, and to the period following the Incorporation Charter of 1838; while Leamington, now an important town, owes much of its prosperity to Dr. Jephson, albeit Mr Timmins passes him over unnoticed. Strangely enough, the town of Rugby meets with the same neglect at his hands. Except as the birthplace of Matthew Holbeche Bloxam, the historian of English Gothic architecture, and as the scene of Dr. Arnold's labours, the place is scarcely mentioned, though its growth has been remarkable. Perhaps an excuse may be suggested by the fact that Mr. Timmins is an antiquary, and that his interest lies chiefly in the past. To him—as in some degree to others also—Stratford-on-Avon is the principal town in Warwickshire, and all that relates to Shakspeare of paramount importance. But Mr. Timmins' sins of omission are not confined to the above examples. In any list of the "Worthies of Warwickshire" we should expect to find the names of the late Mr. Evelyn Shirley and Mr. Chandos Wren Hoskyns. The former,—a genealogist of the first rank (the original of Mr. Ardenne in "Lothair"),—was a Warwickshire man to the backbone, and the latter made the county his home after his marriage with the ultimate heiress of Sir Christopher Wren, and wrote at Wroxall Abbey his fascinating "Chronicles of a Clay Farm." We have looked in vain for some other well-known names, but are bound to add that, nevertheless, small as the county is, its list of eminent natives or residents is unusually long. Drayton certainly, and perhaps Will. Somervile, may claim a place in the class which Shakespeare heads, and among authors whose fame is neither local nor fugitive we may surely place Addison, Landor, Arnold, and "George Eliot," besides the never-to-be-forgotten Dugdale.

If we turn from persons to places, Warwickshire can boast of a goodly number of historic sites and spots of interest. First there is Stratford (whose memories attract more pilgrims than Becket's shrine ever drew). Then Warwick Castle, mainly rebuilt in the 14th century, is full of interesting relics. "The entrance gate," says Mr. Timmins, "only a few years ago, had some of the hooks from which wool-sacks were said to have been suspended to protect the wall from attacks during the great Civil War. The great inner gateway, with its double portcullis and machicolated tower, is an excellent object-lesson of the art of war four centuries ago." But even Warwick, in spite of the grandeur

which has survived the vicissitudes of fortunes, must yield in interest to the ruins of Kenilworth, and to those especially whose knowledge of English history is derived from the Waverley Novels, its picturesque remains will recall many a romantic scene. It does not come within our province to discuss the story of Amy Robsart. If Kenilworth was not her prison, it was certainly that of Edward II. centuries before, and within its walls Leicester's grand tournament in 1268, and Queen Elizabeth's magnificent reception in 1562, were held. Maxtoke Castle lies outside the tourists' beat. It is an excellent specimen of an Edwardian fortress, and has undergone comparatively trifling changes in its external appearance. It lies low, and is surrounded by a moat, across which access to the great court is gained through a gateway, between two lofty hexagonal towers. Tamworth is less pleasing, and, in fact, is little more than a solid square block of masonry, but its very simplicity proclaims its high antiquity. Astley Castle, built of red and grey sandstone, belongs to a much later period, and, though castellated in appearance, is in other respects an Elizabethan dwelling-house. Of far higher interest is Compton Wynyates, built in the early part of the sixteenth century, and, in its main features, still unaltered. Mr. Timmins does it only bare justice in describing it as "a marvellous and artistic combination of stone, wood, and brick." The chimneys alone are a study, and the carved oak work in the rooms and galleries is wonderfully well preserved. No doubt Compton Wynyates owes its preservation to its secluded position, and we can see in its immunity from destruction the reason which impelled builders in olden times, when castles ceased to be erected, to select unobtrusive sites. Equally well preserved, but of smaller size, is Baddesley Clinton, a moated manor-house of the latter part of the fifteenth century, which still remains in the same family,—the Ferrers family,—to which it owed its erection. Upon what principle Mr. Timmins has excluded from his book all notice of Aston Hall we are unable to say. It is true that the house and its surrounding park have been purchased by the Corporation of Birmingham, and most of the latter has been built over, but the mansion still stands, and has not wholly ceased to deserve Dugdale's encomium: "A noble fabric, which for beauty and state much exceedeth any in these parts." Those who desire to study its features, and compare its plan with that of Compton Wynyates, should consult an excellent work, entitled "Illustrations of old Warwickshire Houses," published some ten years ago by Mr. Niven. We have left ourselves too little space to speak of the churches of the county. Coventry,—that city which is perhaps more full of old buildings than any other in England,—still boasts its "three spires" (though one of them has been perilously near destruction), and we are glad to hear that the "restoration" (we dread the word) of St. Michael's Church has been carried out "with excellent judgment and good taste." We are not great admirers of this great church, with its enormous windows and unsymmetrical form, but the group of buildings of which it is the most prominent member is almost unsurpassed. St. Mary's, Warwick (with the Beauchamp Chapel), the Parish Church of Stratford, Temple Balsall and Coleshill churches are well worth notice, but the Midland Counties cannot in this respect vie with the Eastern.

We have not hesitated to point out the defects which we have noticed in Mr. Timmins' volume, but gladly add that both it and the series to which it belongs are of genuine value, and will, we believe, help largely to remove that ignorance of their own land which is a reproach to many of our countrymen.

The Thirlmere Water Scheme. — It is understood that the contract for the work to be done at the foot of Thirlmere Lake in building the dams and diverting roads, &c., in connexion with the Manchester Waterworks has been let to Messrs. Grisenthwaite, Penrith, and Beaty Brothers, Carlisle. The contract is about 120,000*l.*, and in a few weeks it is expected that over 1,000 men will be employed.—*Manchester Courier.*

Results of Auction Sales in 1889.—From *Extracts from Estate Exchange Registers* we learn that the amount of auction sales of property reported to the 31st ulto. was 4,218,274*l.*, or, with private contract sales, 4,304,954*l.*, as against 4,447,840*l.* in 1888, 3,989,099*l.* in 1887, and 4,120,044*l.* in 1886.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

12, Instantaneous Grip Vices. J. Singleton.

According to this invention, on the spindle of cabinet-makers' or joiners' vices a collar to join up to the neck of the loose jaw, such collar being for the purpose of drawing out the loose jaw of the vice. A fixed collar is placed upon the spindle to secure one end of the spring placed upon the shafts. The shaft is threaded or screwed so as to fit the box nut, and by this and other mechanical details the articles are firmly secured in the jaws of the vice. Or instead of the cam being threaded the nut is made in the form of a boss with a solid collar so as to fix on a loose cam, secured by a loose collar, so that the cam can be worked without interfering with the screw part.

15, Lock Knobs. W. H. Bird.

By this invention a metal nut with an internal screw thread moves upon a suitably threaded square lock spindle. This nut has formed upon its circumference a groove into which a detent attached to the neck of knob closes when in position.

26, Ships' Berths. E. Lawson.

This invention consists in a modification of the half lee-rail used in fitting ships' berths, and is so made, turning on bosses or joints, that the rail may be turned up out of the way when not in use, and can be readily removed from the berth when necessary, or can be applied to either end of the berth, if wished.

35, Ornamental Glass Tablets, &c. G. Fyfe.

According to this invention, the surface of the glass is coated with a preparation of isinglass and gold applied. A transfer is then taken from a litho stone, and put on the work before the medium dries. The back of the transfer is then washed away, leaving the design upon the glass.

107, Wheelbarrow Bodies. J. W. Sankey.

The bodies of the barrows are, according to this invention, stamped in one piece out of a flat plate, the corners being gathered or puckered so as to give the necessary slope or taper to the body, and the surplus metal at the corners is taken up and utilised.

123, Keys or Wedges for Railway Chairs, &c. S. Daurchewsky.

This invention relates to wooden keys, which, having some advantages to balance the disadvantages they possess in shrinking and becoming loose in dry weather, are extensively used in railway work. They are simple and readily procurable, holding the rail both laterally and vertically in the chair; they are also elastic and reserve their original dimensions after having been subjected to a heavy compressed force. The key, which is the subject of this patent, is of wood and metal,—a joint key,—and is provided also with a suitable appliance for preventing it dropping out of the chair owing to vibration or shrinkage.

147, Locks. W. Kneen.

The levers of locks are actuated by weights or gravitation instead of springs. The levers or tumblers are made with a weighted end, and the bolt also slides upon an incline, and by its own weight falls into a position for latching or locking the door.

198, Hydraulic Lifts or Hoists. A. A. Vuigrier.

Lifts are generally arranged to rise in a vertical direction. The common centre of gravity of the platform and the load never coincides exactly with the axis of the hydraulic cylinder or with the resultant of the hydraulic pressure if there are several cylinders. The platform is, therefore, subjected to a strain, the moment of which cannot be balanced except by horizontal reactions which, according to the nature of the construction, are either entirely derived from the guides along which the platform rises and falls, or partly from the guides and partly from the packing of the hydraulic cylinder. These reactions produce friction and jamming in certain cases, sufficient to entirely stop the motion of the lift. Instead, therefore, of the axis of the hydraulic cylinder being arranged vertically, it is inclined at a considerable angle, while the platform remains horizontal, suitable guides and wheels being fitted to assist the easy movement.

213, Portable and Collapsible Reading-desk. E. Pillow.

The board of this reading-desk is hinged and folded, and, when open, is inclined. It is provided with spring-clips for holding the book in position; provision is also made for keeping pens and pencils, and a small lantern may be fixed when the desk is used by a lecturer who desires to signal instructions to an assistant or operator.

282, Conduits for Electric-Mains. F. Coates.

By this invention it is proposed to lay conduits in such a manner as to avoid to a great extent the breaking or opening-up of the pavement or roadway when the mains are once laid, and thereby to avoid interfering with the traffic and to facilitate the repairs to mains by constructing the conduits in such a way that they may be easily opened and closed, at the same time providing the conduits with suitable locks or fastenings to prevent their being tampered with. They are made in stone, earthenware, or cement, and placed at the side of the kerb or roadway.

*** In consequence of the Patent Office authorities not having issued the "Official Journal of Patents," we are compelled to hold over the "New Applications, &c.," till next week.

MEETINGS.

MONDAY, JANUARY 13.

Royal Institute of British Architects.—Special general meeting of members only, to consider the question of "Articles of Pupilage;" followed by a business general meeting (for members only) to ballot for new members, to receive the announcement of the awards of studentships and prizes, and to consider the "Sundry Powers and Provisions" portion of the London County Council (General Powers) Bill. 8 p.m.

Royal Academy of Arts.—Prof. J. E. Hodgson, R.A., on "The Old Masters' Exhibition of 1890." III. 8 p.m.

TUESDAY, JANUARY 14.

Institution of Civil Engineers.—Mr. G. F. Lyster on "Recent Dock Extensions at Liverpool." 8 p.m.

Society of Biblical Archæology.—Anniversary meeting 8 p.m.

WEDNESDAY, JANUARY 15.

Society of Arts.—Adjourned discussion on Sir Robert Rawlinson's paper on "London Sewerage and Sewage." 8 p.m.

British Archæological Association.—Mr. A. S. Canham on "The History of Crowland: its Charters and Ancient Crosses." 8 p.m.

Institution of Civil Engineers.—Students' Visit to the Sewage Works at Crossness. (Train to Abbey Wood leaves Charing-cross at 12.20 p.m.)

Builders' Foremen and Clerks of Works Institution.—Annual Meeting. 8·30 p.m.

Inventors' Institute.—(1) Mr. S. J. Mackie on "Lessons Deducible from Recent Fires." (2) Several short descriptive Papers will be read on "Inventions for Minimising the Dangers of Fires, and Saving Human Life." 8 p.m.

THURSDAY, JANUARY 16.

Royal Academy of Arts.—Prof. J. E. Hodgson, R.A., on "The Old Masters' Exhibition of 1890." IV. 8 p.m.

FRIDAY, JANUARY 17.

Architectural Association.—Discussion on the Progressive Examinations of the R.I.B.A., to be opened by Mr. Arthur Cates. 7.30 p.m.

Bradford Historical and Antiquarian Society.—Mr. W. Scruton on "Some Fragments of Bradford History." 8 p.m.

Miscellanea.

Messrs. C. Leary & Co's Annual Circular on Hard Woods states that the hard wood trade of London has had a full share in the general improvement of business which has characterised the year 1889. Apart from a period of stagnation during the dock strike, the record is distinctly satisfactory, a large volume of trade having been combined with a generally good, though not unduly inflated standard of values. At the same time, it is undoubtedly a fact that the business passing through London would be considerably greater if the facilities for handling goods were equal to those afforded by other ports. As to East India teak, the stock of timber and plank is 50 per cent. larger than at the close of 1888, and there are besides 3,750 loads, recently arrived, yet to be taken into account. The tonnage afloat and under charter to load is 32,678 and 24,119 respectively, against 19,466 tons afloat and 25,360 tons to load at the beginning of 1889, but a large number of cargoes is already sold. The year just closed has been remarkable for the imports into Europe having been the largest on record, and for the great activity in the shipbuilding and rolling-stock industries, which, moreover, promises to continue for some time to come. The market has been in a good position during the greater part of the year, importers not having been under necessity to force sales, and the business in floating cargoes has been very large, and at good prices. Heavy arrivals during the last three months have somewhat unsettled the market, and the tone is less satisfactory. Cargo quotations are 12*l.* to 13*l.* per load.

Resident Engineer for the Ribble Works.—The *Manchester Courier* reports that on Monday a meeting of the Ribble Committee was held at the Town Hall, Preston, for the purpose of interviewing the six selected candidates who had applied for the position of Resident Engineer to the Ribble works. The applicants were reduced to three—Mr. A. F. Fowler, Navigation Engineer to the York Corporation; Mr. Archibald Hamilton, Resident Engineer to the new works on the Clyde Navigation Trust; and Mr. John Stirral, chief assistant to Messrs. D. & T. Stevenson, engineers, Edinburgh.

Messrs. Foy, Morgan, & Co.'s Annual Wood Report, 1889.—Messrs. Foy, Morgan, & Co., in their annual report, say:—"The past year, while not leaving importers as good a result as the one before it, has still been marked by a certain firmness in prices, and although the highest f.o.b. figures of the opening months were not quite maintained, the abatement was neither general nor serious, although at the same time sufficient to enable shippers to realise their stocks. The margin between spot prices and f.o.b. cost has been exceedingly meagre, and while many cargoes have left nothing beyond bare import cost, some have even been distinctly sold at a loss. These drawbacks have to a great extent been discounted by a wonderful absence of bad debts, and by the sound, though quiet state of the building trade, enabling importers to sell retail to consumers at remunerative figures. The hoped-for improvement in the building trade did not manifest itself during the year, but there are signs that its coming may be expected in the near future, owing to the general revival of trade all over the country, and to the general commercial prosperity that has now set in throughout the kingdom. Upon this will probably depend the stability of the market for the year. The figures of the dock stocks are very similar to those of 1888, the only distinct decrease being in Baltic deals. The effect of the strike was not only felt in the curtailment of the deliveries, but the loss sustained by depreciation, owing to exposure to the weather, of many fine cargoes of deals and battens, was enormous, and has not even yet been fully brought home to holders. Auctions have not been heavy, and this shows that the demand has been continuous, and has at no time required the drastic remedy of forced sales to stimulate consumption. Deliveries from the docks have been good, and had it not been for the unfortunate strike they would have been considerably larger, thus giving an index to the steady demand which has ruled, and which during the autumn has been far better than for a considerable period."

The English Iron Trade.—The English iron trade opens the year with the market in an active and buoyant condition, improvements in prices being reported from all directions and for every description of the crude and finished article. Notwithstanding advanced and advancing rates, business in pig-iron is comparatively brisk. The Glasgow warrant market has been strong, and a large amount of buying has been going on. In several districts makers have practically withdrawn quotations, and they are generally unwilling to commit themselves forward. Where, however, actual business is done, this is effected at higher rates. Scotch makers quote this week from 6d. to 1s. 6d. higher per ton. Cleveland iron has been put up 2s. 6d. a ton, and Bessemer 3s. 6d. in the North-West, where, also, Spiegeleisen has advanced to the phenomenal figure of 130s. a ton, being an increase of 32s. 6d., or over 30 per cent. in a week. Finished iron is also much stronger, and both marked and common bars have been raised 10s. per ton, while black sheets and Welsh bars have improved 15s. A similar tendency is displayed by steel. Rails and blooms are 5s. a ton dearer, and billets and slabs, 12s. 6d. Shipbuilders are beginning to book fresh orders with the New Year, notwithstanding the increasing cost of tonnage. Engineers have their hands very full of orders, and plenty of new business is coming forward. —*Iron.*

Yorkshire College Engineering Society.—At the meeting of this society on Monday evening, the President (Professor Arch. Barr, B.Sc.) delivered his annual address. As Professor Barr is leaving Leeds to fill the Chair of Engineering at the University of Glasgow, the opportunity was taken to present him with a testimonial from the members expressive of their appreciation of his services to the society. In the absence through illness of Mr. Josh. Buckton, chairman of the Engineering Committee of the College, Mr. Wicksteed occupied the chair. Professor Barr spoke for an hour on the lessons to be derived from the life of James Watt, the founder of the profession of engineering. Mr. Goodman, the new Professor of Engineering at the College, also spoke.

Birkbeck Institution. — The Monday evening lectures in "Quantity Surveying" are from 6.30 to 7.30, and not from 6 to 7, as advertised in our last issue.

Aberdeen Trade in 1889.—During the past year the various industries followed in Aberdeen have, with one or two minor exceptions, been prosperous, and in some cases workers have shared in the improvement. In the granite trade a large amount of business has been done, although the merchants complain that, owing to over-competition, profits have been forced down to a very low point. In the polished monumental and ornamental granite departments there has been a satisfactory activity and a large export of finished articles to the Colonies and abroad, not to speak of the trade in the home country; and the granite merchants have plenty of orders in hand for the current year. There has been no change in wages. It may be mentioned that, besides the "native" or Aberdeenshire granites, granite of various colours from Sweden and other "foreign" granites are now, to some extent, employed in the trade, and that a commencement has been made in a new branch of industry, in the export to America of stones dressed and ready to be used in building. The "boom" in house-building in Aberdeen is now over, as is evidenced by the fact that the valuation roll shows that there are in the town 1,241 vacant houses and 322 vacant shops, of a united valued annual rental of 16,994*l.*, and by the further fact that the number of plans of buildings lodged with the authorities for sanction has now reached what may be called a normal figure. During the year the Town Council have approved, as regards lines, levels, &c., plans which may be classified as follows:—Dwelling-houses, 116; cottages, 17; alterations and additions, 74; halls, 2; church, 1; miscellaneous (including warehouses, workshops, stables, &c.), 42. In many cases the premises described as "dwelling-houses" have shops on the ground-floor. All these buildings are within the bounds of the city proper; and there has also been a considerable amount of building in the suburban districts adjoining. A commencement has been made with the new prison on the south side of the Dee, and work is well advanced at the new Infirmary buildings in Spa-street. There are no other buildings of any special magnitude in prospect. The Town Council have taken the preliminary steps for the formation, under the improvements scheme, of a new street in the east-end running from Castle-street in the direction of the Links.

Engineering Works on the Danube.—The Hungarian Government are inviting tenders for the engineering works which are to be carried out at Orsova, on the Danube, at the so-called Iron Gate. The work is divided into three sections, viz.:—1. The blasting of a channel in the river-bed to a depth of 2 mètres below mean level of water, and having a width of 60 mètres. The quantity of rock to be removed is about 160,000 cubic mètres. 2. The construction of two so-called "Stau" dams, requiring 620,000 cubic mètres of rock *débris*, and 100,000 cubic mètres of facing stone. 3. Blasting of a channel in order to avoid the worst rapid, requiring the removal of 240,000 mètres of rock, and 95,000 cubic mètres of facing stone. The most difficult part of the work will consist in the submarine blasting, as the current runs at the rate of 4 mètres per second. The Government have already attempted this work by Lieut.-Col. Lauer's method, consisting in dropping dynamite cartridges, attached to a fuse, to the bottom, but without success. Tenders are, therefore, now invited, which must be sent in to the Hungarian Minister of Communications at Buda-Pesth, before January 31 next, and who will furnish, for a sum of 20 florins, all drawings, plans, specifications, &c., the amount of caution money to be deposited by the successful tender, the deposits of the unsuccessful ones being, of course, returned.

Obituary.—We regret to hear that Mr. Edward Ellis died at his residence, Bruce Grove, Tottenham, on the 8th inst., after a long and painful illness, in his 73rd year. He had practised as an architect in Fenchurch-street, London for nearly forty-five years,—during the last ten years in partnership with his son, Mr. Edward Brookes Ellis, A.R.I.B.A.,—and retired about three years ago in consequence of failing health. He had carried out many large buildings in London, chiefly offices and warehouses; churches at Peterborough and Edmonton; the Corn Exchange at Bury St. Edmunds; vicarages at Oakham, Higham, Edmonton, and Peterborough; schools for the Tottenham School Board; and many private houses in the neighbourhood of London.

Proposed Railway Survey of the Khyber. In connexion with the proposed railway survey of the Khyber, it may be noted that there are at least two feasible routes through the hills to to the west of Peshawar,—from Jamrud by the Khyber direct, or by incline along the Kabul River to Dakka. The latter is the one which is to be surveyed at once, or so soon as the needful tribal arrangements are satisfactorily made. By the former route, to Jellalabad, and for some distance beyond, the only really difficult lengths would be from Ali Masjid across the Kotal to Landi Khana, and possibly a short length at Chorgalli between Barikab and Ali-Baghan. If ever the time comes when a railway has to be made to Kabul itself, there will be no difficulty in carrying the line on from Jellalabad. By the Dorunta Gorge, Katz-i-Aziz, up to the Adrak-Badrak Kotal, not very far from Jagdalak, or to within about fifty miles of Kabul, there would be a certain amount of rock-cutting, though nothing insurmountable. But it would be a question if from Jellalabad a better alignment would not be by the Lughman Valley and the Kabul River. There is every reason to believe that a perfectly practicable route could be obtained in this direction, which in former times was used for the movement of formidable armies, and is only now avoided by kafilas on account of the want of proper escort. —*Indian Engineer.*

Sewer Ventilation into House Chimneys!—Mr. W. Santo Crimp, the Engineer to the Wimbledon Local Board, writes to the *Western Morning News* (Plymouth) as follows:—"I have recently had occasion to examine the literature relating to sewer ventilation, and in the first volume of the Proceedings of the Association of Municipal and Sanitary Engineers I found this paragraph:—

'Plymouth.—The sewers are ventilated by chimneys or shafts into house chimneys. Very few persons know where they are, to prevent prejudice . . . . or imagination that they are injurious to the residential property.

This means, in the cases of those houses where chimneys have been utilised as sewer ventilators, that when down draughts occur the sewer gas is carried into the living-rooms. May not this explain the prevalence of scarlet fever in Plymouth?" Upon which the Editor of the journal in question remarks: "Such a statement, in such a form, ought to be at once replied to. But we should be surprised to find it to be a fact that sewer ventilation is attempted in Plymouth by means of any chimneys of dwelling-houses."

Sir A. B. Walker.—At a special meeting of the Liverpool City Council on Wednesday, the honorary freedom of the City was presented to Sir A. B. Walker, Bart., in recognition of his munificent gifts of an art gallery and of the engineering laboratories in connexion with the University College. The document was enclosed in a casket, and was presented by the Mayor, Mr. Thomas Hughes, on behalf of the inhabitants of the city. Sir Andrew, in acknowledging the gift, expressed his great appreciation of the honour, and said that, with regard to the two institutions he had established, the best thanks he could receive was the consciousness that they were doing a great and important work in the community.

New Swedish Society of Builders.—A new society of builders has been formed in Stockholm, which at its first meeting enrolled over fifty master builders and architects as members. One of the main objects of the association is to improve the relations between employer and workman in the building trades, and to resist strikes. On the latter point the society has been so far successful as to put an end to the recent masons' strike in Stockholm.

The Chief Engineer-Elect of the London County Council.—The *Liverpool Post* states that Mr. Clement Dunscombe, the late Engineer to the Liverpool Corporation (recently appointed Engineer to the London County Council), left Liverpool on Saturday, in Messrs. Elder, Dempster & Co.'s steamer *Calabar*. Mr. Dunscombe is going to Grand Canary for the benefit of the sea trip, and the beautiful climate of the Canaries.

The Proposed Underground Railway in Edinburgh continues to excite much interest in the city. The opposition to it is strong, and, if the scheme is persisted in, steps are to be taken to prevent its fulfilment. Various alternative schemes have been proposed, some of which, it is alleged, would, if carried out, be a greater boon to the public than the Princes-street scheme.

The Proposed Strand Improvements—The report of the Parliamentary Committee of the Strand Board of Works upon the London Street (Strand Improvement) Bill of the London County Council was adopted at the meeting of the Board on Wednesday. The Board's chief objections to the Bill are (according to the *Standard*) in reference to the "betterment clauses," which provide for a rent-change upon property within a given area. The report protests against "the arbitrary way in which the area supposed to be specially benefited by the improvement is defined. It seems to the Committee peculiarly unreasonable to exclude Somerset House, Lancaster-place, the west side of Wellington-street, Wellington-street North, Covent-garden Market, the Law Courts, Lincoln's Inn, the Temple, and Incorporated Law Society from the area supposed to be specially benefited. If there is one thing more than another which has rendered the improvement urgently necessary in the public interest, it is the fact that the Law Courts have been erected in the immediate neighbourhood of the proposed improvement." The *Daily Telegraph* quotes the following paragraph from the report:—"Your committee desire to call special attention to the fact that it is impossible in the case of this scheme that any new and valuable frontage can be obtained to the widened street by adjoining landowners, as in the case of the Shaftesbury-avenue improvement, inasmuch as the London County Council must purchase both sides of Holywell-street to effect the improvement, and in no case will it be possible for any owner to obtain a frontage to the Strand which he does not now possess. In consequence of the improvement, the London County Council become the sole owners of the new frontages on the north side, while the south side of the Strand will, for business purposes, be deteriorated in value. Your committee are of opinion that an improvement in this locality has been long called for in the interests of the metropolis as a public improvement." The Board resolved to oppose the Bill in Parliament, and to ask Mr. W. H. Smith to receive a deputation on the subject.

Humours of an American Sanitary Journal.—The *Sanitary News*, of Chicago, in its issue for Dec. 21 last, has been pleased to appropriate from our issue of Nov. 30 not only the report of Mr. Henry Law's paper "On a Method of Regulating the Maximum Discharge of Sewers," but the block (which the Editor, or a clever printer, calls a "Diagraphm") illustrating the same. If our American *confrère* had quoted the source whence he derived his matter, its value would certainly not have been less. However, we will pursue a more excellent way, and give all the credit that is due to the Editor of the *Journal* for the following extract, which is not altogether inapplicable to London just yet, we fear, in spite of the movement for the registration of plumbers:—

Plumber (just commencing business for himself, to his bookkeeper): What is the meaning of sanitary?

Bookkeeper (always ready for the occasion): Well, sanitary is one of those words that has a Latin root which enters into the composition of many English words, such as sanguine, sanguinary, *sang froid*, &c., and means no cure, no pay.

Plumber: Say, painter, leave off the sanitary, and make it just plain plumber.

Next morning low over the do: i hung the following sign:—

HENRY H. SMITH

JUST

PLAIN PLUMBER.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	7	0	0	7	15	0
Teak, E.I. ....load	12	0	0	14	0	0
Sequoia, U.S. ....foot cube	0	2	3	0	3	0
Ash, Canada ....load	3	0	0	4	5	0
Birch ,, ...	3	0	0	4	15	0
Elm ,, ...	3	10	0	4	15	0
Fir, Dantsic, &c.	2	0	0	3	10	0
Oak ,, ...	2	10	0	4	10	0
Canada	5	10	0	7	0	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	3	0	0	5	5	0
Lath, Dantsic ....fathom	4	10	0	5	10	0
St. Petersburg	5	0	0	6	10	0
Wainscot, Riga, &c. ....log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std. 100	8	10	0	11	0	0
,, ,, 4th and 3rd	7	0	0	8	0	0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Deals—Riga	7	0	0	9	0	0
St. Petersburg, 1st yellow	11	0	0	14	0	0
,, 2nd ,, ...	9	0	0	10	10	0
,, white	6	10	0	10	0	0
Swedish	7	10	0	16	0	0
White Sea	9	0	0	17	0	0
Canada, Pine, 1st	16	0	0	26	0	0
,, ,, 2nd	11	0	0	17	10	0
,, ,, 3rd, &c.	8	0	0	10	10	0
,, Spruce, 1st	9	0	0	11	0	0
,, ,, 3rd and 2nd ..	7	0	0	9	0	0
New Brunswick, &c.	6	0	0	8	10	0
Battens, all kinds	6	0	0	17	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	6	0	0	7	9
Cedar, Cuba ....foot	0	0	4	0	0	5
Honduras, &c.	0	0	4	0	0	4¾
Mahogany, Cuba	0	0	5	0	0	6½
St. Domingo, cargo average ..	0	0	5	0	0	6½
Mexican, cargo average	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	6½
Box, Turkey ....ton	4	0	0	13	0	0
Rose, Rio	15	0	0	20	0	0
Bahia	14	0	0	18	0	0
Satin, St. Domingo ....foot	0	0	9	0	1	3
Porto Rico	0	0	10	0	1	6
Walnut, Italian	0	0	4½	0	0	6½

METALS.	£.	s.	d.	£.	s.	d.
IRON—						
Bar, Welsh, in London ....ton	7	15	0	8	5	0
,, ,, at works in Wales	7	5	0	7	15	0
,, Staffordshire, in London..	8	10	0	9	10	0
COPPER—British, cake and ingot	57	10	0	58	10	0
Best selected	59	0	0	60	0	0
Sheets, strong	66	0	0	67	0	0
Chili, bars	52	0	0	0	0	0
YELLOW METAL....lb.	0	0	5¾	0	0	6
LEAD—Pig, Spanish ....ton	14	5	0	14	7	6
English, com. brands	14	7	6	0	0	0
Sheet, English	16	10	0	16	10	6
Pipe	17	0	0	0	0	0
TIN—Straits	96	10	0	0	0	0
Australian	97	0	0	0	0	0
English Ingots	101	10	0	0	0	0
OILS.						
Linseed ....ton	20	7	6	20	12	6
Cocoanut, Cochin	26	10	0	0	0	0
Ceylon	24	0	0	0	0	0
Palm, Lagos	25	10	0	0	0	0
Rapeseed, English pale	33	5	0	0	0	0
,, brown	31	15	0	32	0	0
Cottonseed, refined	22	5	0	0	0	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	5	10	0	6	10	0
,, refined	7	0	0	12	0	0
TAR—Stockholm....barrel	1	6	6	0	0	0
Archangel	0	17	6	0	0	0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page
Designs for Galleries or Balconies, Twn-hall	Leeds Corporation	50*l.* and 25*l.*	Jan. 31st	ii.
Market House and Public Offices	Gainsboro' Local Board	26*l.* 5s. and 5*l.*	Mar. 7th	xii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Temporary Infectious Diseases Hospital....	Hendon Local Board...	S. S. Grimley....	Jan. 13th	ii.
Filter Presses, &c.	Tottenham Local Board	J. E. Worth	Jan. 14th	ii.
Works and Materials....	Wandsworth Bd. of Wks.	*Official*	do.	ii.
Mansion	R. J. Balston....	A. Waterhouse	do.	xii.
Making Roads	Chiswick Local Board	A. Ramsden	Jan. 15th	xii.
Kerb and Channel Stone	Folkestone Corporation	A. W. Conquest	do.	xii.
New Buildings, &c....	Smedley's Hydropathic Establishment	G. E. Statham	Jan. 18th	xii.
Sewerage Works	Alton (Hants) Loc. Bd.	Jas. Mansergh	Jan. 20th	xii.
Schoolroms & Alteration to Chapel, Coventry	The Trustees....	H. W. Chattaway....	Jan. 21st	xii.
Kerbing, Tarpaving, Metalling, &c., Works	Lewisham Bd. of Wks.	*Official*	do.	xii.
Sewering, Paving, and making-up Roads, &c.	Cheshunt Local Board	T. Bennett....	Jan. 22nd	xii.
School Buildings, Fencing in Site, and Land Drainage and Making Roadway	Clayton and Keymer School Board	E. J. Hamilton....	do.	ii.
Concrete Paving	Gt. Yarmouth U.S.A....	J. W. Cockrill	Jan. 23rd	ii.
Repairing Buildings, &c.	Com. of H.M. Works...	*Official*	Jan. 24th	ii.
Gas Engines, Pumps, and Plant....	Uxbridge Local Board	G. & W. L. Eves	Jan. 27th	xii.
Restoration Works	Ven. Archdn. Denison	E. H. Lingen Barker ...	Not stated.	xii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works....	Bath U.S.A.	2*l.* 10s. per week ...	Jan. 13th	xvii.
Inspector of Nuisances	St. Marylebone Vestry	2*l.* 5s. per week.....	Jan. 16th	xvi.
Sanitary and Building Bye-laws Inspector	Folkestone Corporation	150*l.*	Jan. 18th	xvi.
Assistant Surveyor...	Frome Local Board...	75*l.*	Jan. 25th	xvii.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

ASHBURTON.—For alterations and additions to Wood Place House and stables, for Mr. H. M. Firth. Mr. C. G. S. Acock, architect, Ashburton:—

Knight & Lear, Ashburton.....	£489	17	0
Arscott & Wakeham, Buckfastleigh .	475	0	0
J. H. Foaden, Ashburton	349	0	0
,, (with further alterations) (accepted)....	407	0	0

DERBY.—For the erection of a 170-quarter malting, with cellars under and malt stores, for Messrs. Alton & Co., Limited. Mr. R. Hardy, architect, 8, Thurland-street, Nottingham:—

W. E. Eaton, Derby	£7,670	0	0
T. Fish & Son, Nottingham.....	7,500	0	0
W. Walkerdine, Derby	7,335	0	0
Walker & Slater, Derby	7,230	0	0
H. Vickers, Nottingham	7,000	0	0
T. Lowe, Burton	6,700	0	0
F. Slater, Derby (accepted).....	6,390	0	0
Ironwork.			
Measures Bros., London (accepted)	668	0	0

GOSPORT.—For laying new floor and other alterations to stores (The Quay), for Messrs. Lapthorn & Ratsey. Mr. W. Yeardye, architect, 30, High-street, Gosport:—

W. Hill & Co., Gosport	£317	0	0
W. Morse & Son, Gosport	299	6	6
J. Croad, jun., Gosport (accepted) ..	242	17	0

LONDON.—For erecting block of model dwellings and shops, Hoxton High-street, for Mr. F. Alliston. Mr. James Linsell, architect:—

Porter	£4,797	0	0
G. E. Todd.....	4,789	0	0
W. Shurmur	4,761	0	0
Wall Bros.	4,742	0	0
Richardson	4,738	0	0
M. Gentry	4,700	0	0

LONDON.—For alterations and additions to the "Cock" Tavern, Denmark-hill, Camberwell, for Mr. A. Ayres. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

F. Mark, Edgware-road	£2,780	0	0
Turtle & Appleton, Clapham Junction.....	2,540	0	0
S. R. Lamble, Kentish Town	2,459	0	0
Holloway Bros., Battersea	2,350	0	0
J. Beale, Westminster Bridge-road	2,200	0	0
J. Ford & Sons, Denmark-hill	2,195	0	0
J. Tyerman, Walworth-road*	2,153	0	0

* Accepted.

LONDON.—For alterations and additions to St. Saviour's Church, Upper Chelsea, S.W. Mr. E. Geldart and Mr. J. Randall-Vining, architects, 89, Chancery-lane, W.C.:—

Sprake & Tonman	£3,618	0	0
Stimpson & Co.	3,556	0	0
R. G. Battley	3,518	0	0
Patman & Fotheringham.....	3,385	0	0
S. C. Parmenter, Braintree.....	3,228	0	0
J. T. Chappell	3,127	0	0
W. Johnson	3,127	0	0
Foster & Dicksee, Rugby (accepted)	2,893	0	0

[Architects' estimate, £2,800.]

LONDON.—For building Nos. 8 and 9, Arundel-street, W. Mr. H. H. Collins, architect:—

W. Downs	£4,282	0	0
W. Shurmur	3,591	0	0
Bywaters	3,446	0	0
J. Morter	3,445	0	0
Killby & Gayford.....	3,383	0	0
Grant	3,372	0	0
J. R. Hunt.....	3,292	0	0
Sabey	3,200	0	0
Croaker	3,134	0	0
Garnet.....	2,942	0	0

LONDON.—For slating and finishing carcases of Nos. 27 and 28, Edde-road, Finsbury Park. Mr. W. Eve, architect, 10, Union-court, Old Broad-street, E.C.:—

T. Potterton, Balham (accepted)....	£490	0	0

LONDON. — For erecting factory, Paradise-street, Finsbury, for Mr. H. Lebus. Mr. H. Woodzell, architect:—

J. Anley	£4,880	0	0
Holloway	4,779	0	0
Lascelles	4,632	0	0
Grover	4,589	0	0
Laurence	4,585	0	0
W. Shurmur	4,572	0	0
W. Scrivener	4,421	0	0

LONDON.—For alterations, &c., to premises in Commercial-road, E. Mr. H. H. Collins, architect:—

Killby & Gayford	£1,890	0	0
Ashby & Horner	1,885	0	9
W. Shurmur	1,845	0	0
Hearle & Son	1,783	0	0
Sabey	1,668	0	0
Thompson	1,629	0	0
Calnan	1,548	0	0

LONDON.—For alterations and additions to 25, Sussex-square, for Mr. S. J. Parker, under the superintendence of Messrs. Godwin, Basley, & Co., 28, Cadogan-place, S.W.:—

		Conservatory.
Wilkinson & Son	£1,416 8 3	£249 8 0
Bush & Co.	1,415 0 0	280 0 0
Greatorex & Co.	769 0 0	148 0 0

LONDON.—For pewterer's work to the "Audley Hotel," Audley-street, for Mr. R. H. Barnes. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W.:—

Sanders & Sons, High Holborn*	£145	10	0

* Accepted.

LOWESTOFT.—For new road, sewer, &c, for the British Land Company, Limited, on their Crown Meadows Estate. Mr. Henry B. Michell, surveyor:—

Bennett, Ipswich	£635	0	0
Gibbons, Ipswich	624	0	0
Pizzey, Hornsey	624	0	0
Wilson, Walthamstow (accepted)	615	0	0

NOTTINGHAM.—For the restoration of old buildings at the Castle, and conversion of same into an Industrial Art Gallery, for the Corportion of Nottingham. Mr. Herbert Walker, F.R.I.B.A., architect:—

J. F. Price	£3,850	0	0
E. Hind	3,707	0	0
Fish & Son	3,700	0	0
Woodsend	3,680	0	0
H. Vickers	3,637	0	0
Bell & Son	3,600	0	0
Wheatley & Maule	3,600	0	0
Hudson & Son	3,500	0	0
J. Thomas (accepted)	3,453	0	0

[All of Nottingham.]

PORTSMOUTH.—For the rebuilding of the "Ship Antelope" beerhouse, for Messrs. Simonds & Co., Winchester. Mr. W. Yeardye, architect, 30, High-street, Gosport:—

J. Croad, Portsea	£724	0	0
C. H. Roberts, Southsea	670	0	0
H. Clark & Sons, Landport	663	0	0
J. Crockerell, Landport	629	0	0
T. P. Hall, Southsea (accepted)	584	0	0

READING.—For new granary, for Messrs. H. & G. Simonds, the Brewery, Reading:—

Strong Bros.	£1,173	0	0
Higgs & Sons	997	0	0
Ruffel Bros.	945	0	0
Bottrill & Son, Reading (accepted)	945	0	0

SWANWICK.—For the erection of "Railway Hotel," stables, coach-house, &c., for Messrs. S. & T. N. Blake & Co. Mr. W. Yeardye, architect, 30, High-street, Gosport. Quantities supplied:—

C. Roberts, Portsmouth	£1,511	0	0
J. Croad, jun., Gosport	1,505	4	0
W. Rapley, Gosport	1,382	0	0
W. Franklin, Southampton	1,364	0	0
J. Luke & Son, Gosport	1,250	0	0
Morgan, Isted, & Morgan, Southampton	1,244	0	0
J. Plummer, Fareham	1,230	0	0
T. P. Hall, Portsmouth	1,220	0	0
H. Jones, Portsmouth	1,210	0	0
C. Wareham, Stubbington	1,170	0	0
J. Crockerell, Portsmouth*	1,150	0	0

* Accepted.

UTTOXETER. — For a 100-quarter malting, with cellars, bridge, subway, &c., for the Uttoxeter Brewery Company. Mr. R. Hardy, architect, 8, Thurland-street, Nottingham:—

Baines, Newark	£5,825	0	0
Dennett & Ingle, Nottingham	5,349	0	0
Bissett, Sheffield	5,285	0	0
Slater, Derby	5,056	0	0
Wood, Derby	4,800	0	0
Lowe & Son, Burton (accepted)	4,600	0	0

Ironwork.

Measures Bros., London (accepted)	329	16	6

WEST WICKHAM (Kent).—For the erection of a residence, for Mrs. Thomasset. Mr. Alex. R. Stenning, architect, 121, Cannon-street, E.C. Quantities by Messrs. Mew & Ovenden, 121, Cannon-street, E.C.:—

T. Crossley, Bromley	£4,000	0	0
Ashby & Horner, Aldgate	3,990	0	0
Mid-Kent Building Works, Beckenham	3,909	0	0
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S. Sabey & Son, Islington	3,697	0	0
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B. D.—"One who objected to compete" (we have entire confidence in the *bona fides* of the promoters in this case).—H. E. H.—C. W.—P. A.—H. D. C.—C. W. (hardly what we could publish).—B. Bros. (it is hardly a matter for public discussion. We may point out that the County Council are in no way bound to follow the precedent of the Board of Works).—R. P.—"A Constant Reader" (we presume you are one of the "practical men" referred to. We adhere entirely to the opinion already expressed).—J. T. (should send amounts).—R. C. B. (we do not insert such announcements unless directly requested by the principals).—H. W. J. H. (no space).—J. C., Bolton (we do not require reports of such matters).

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We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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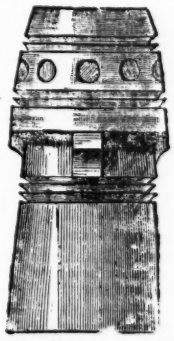

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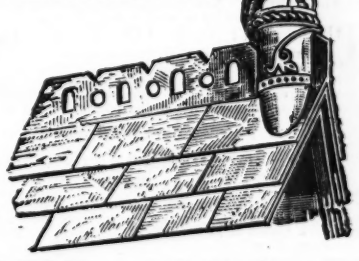

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SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY mornings.

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CIVIL SERVICE COMMISSION.—Forthcoming Examination, JUNIOR EXAMINER in the office of Works (23-30), 29th JANUARY. Technical Training and qualifications necessary.

The date specified is the latest at which applications can be received. They must be made on forms to be obtained, with particulars, from the SECRETARY, Civil Service Commission, London, S.W.

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Feb.	5	BANISTER FLETCHER, Esq. J.P. F.R.I.B.A. D.L.	Architecture in all ages. Illustrated by large drawings and photographs expressly prepared.
,,	12	Professor T. ROGER SMITH, F.R.I.B.A.	Constructional Drawings.
,,	19	Prof. W. H. CORFIELD, M.D.	Modern Sanitation.
,,	26	Professor ARMSTRONG.	The Domestic Fireplace.
Mar.	5	Prof. A. B. W. KENNEDY, F.R.S.	The Forth Bridge.
,,	12	Prof. MARSHALL WARD, Esq. M.A.	The Tree, from the Sapling to the Bench.
,,	19	Prof. W. C. UNWIN, F.R.S.	The Construction of Walls.

Cards giving full particulars can be obtained at the Hall, and at all the large Builders; also of the Secretaries of the Royal Institute of British Architects, and the Architectural Association, 9, Conduit-street, W.C.; at the Architectural Museum, Tufton-street, Westminster; and at the Working Men's Club and Institute Union, 150, Holborn, E.C.

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Dated this 8th day of January, 1890.

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ST. MARYLEBONE.
APPOINTMENT OF INSPECTOR OF NUISANCES.

Notice is hereby given, that the Vestry of the Parish of St. Marylebone are prepared to receive APPLICATIONS (with testimonials) from persons (who must not be more than 40 years of age on last birthday), desirous of becoming candidates for the office of INSPECTOR of NUISANCES, at a salary commencing at 2*l.* 5*s.* per week.

The person elected will be required to reside in the district to which he is appointed, and to discharge the general duties of an inspector of nuisances under the Metropolis Local Management and Nuisances Removal Acts, as well as the duties under the Sale of Food and Drugs Acts, to disinfect premises, and to carry out all duties connected with infectious diseases, as far as he is required under the Sanitary Acts. One month's notice will be necessary on either side to determine the appointment.

Applications (endorsed "Application Inspector of Nuisances") in the handwriting of the candidates, with copies of three testimonials only of recent date, to be forwarded to the Vestry Clerk at the Court House, Marylebone-lane, Oxford-street, on or before THURSDAY, JANUARY 16th inst.

Personal canvassing is strictly prohibited.

By Order
W. H. GARBUTT,
Vestry Clerk.

Court House, St. Marylebone,
January, 1890.

ADVERTISEMENTS.—Thanks! Classification incomplete. 200 applicants. Persons selected will hear further.—LINDA.

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The Corporation of Folkestone desire to receive APPLICATIONS for the above APPOINTMENT.

Candidates must be educated men, and duly qualified to act as Sanitary Inspectors, and possess a thorough knowledge of all branches of trade applicable to the construction of new streets, houses, and buildings. Salary, 150*l.* per annum.

Candidates to send in their applications, credentials, and testimonials, under seal, addressed to "The Town Clerk, Folkestone," and marked, "Sanitary Inspector," not later than SATURDAY, the 18th JANUARY instant.

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Folkestone, January 10th, 1890.

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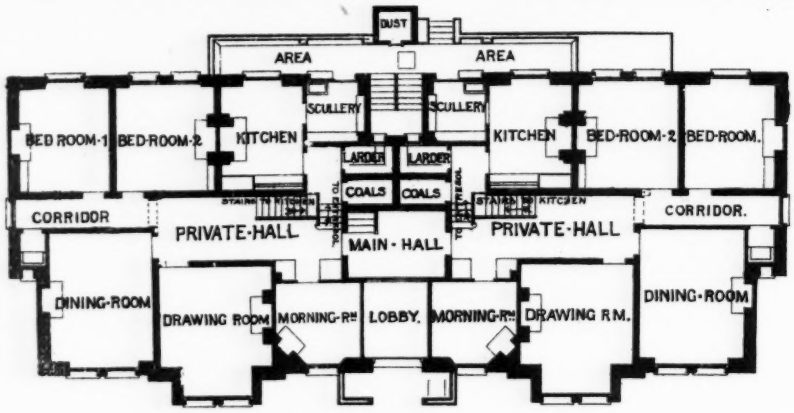


GROUND FLOOR PLAN.

PRIORY MANSIONS, KILBURN.—

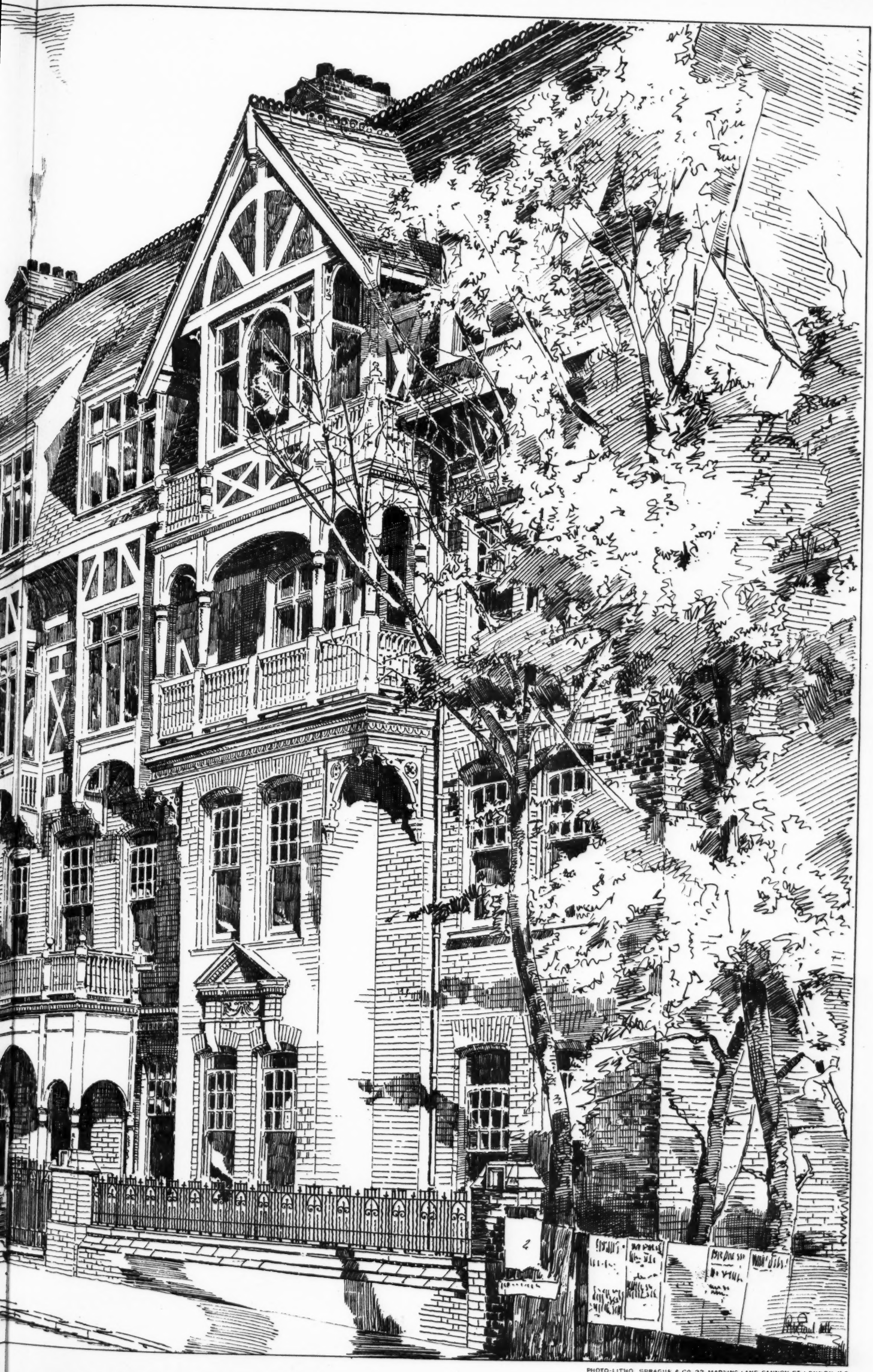
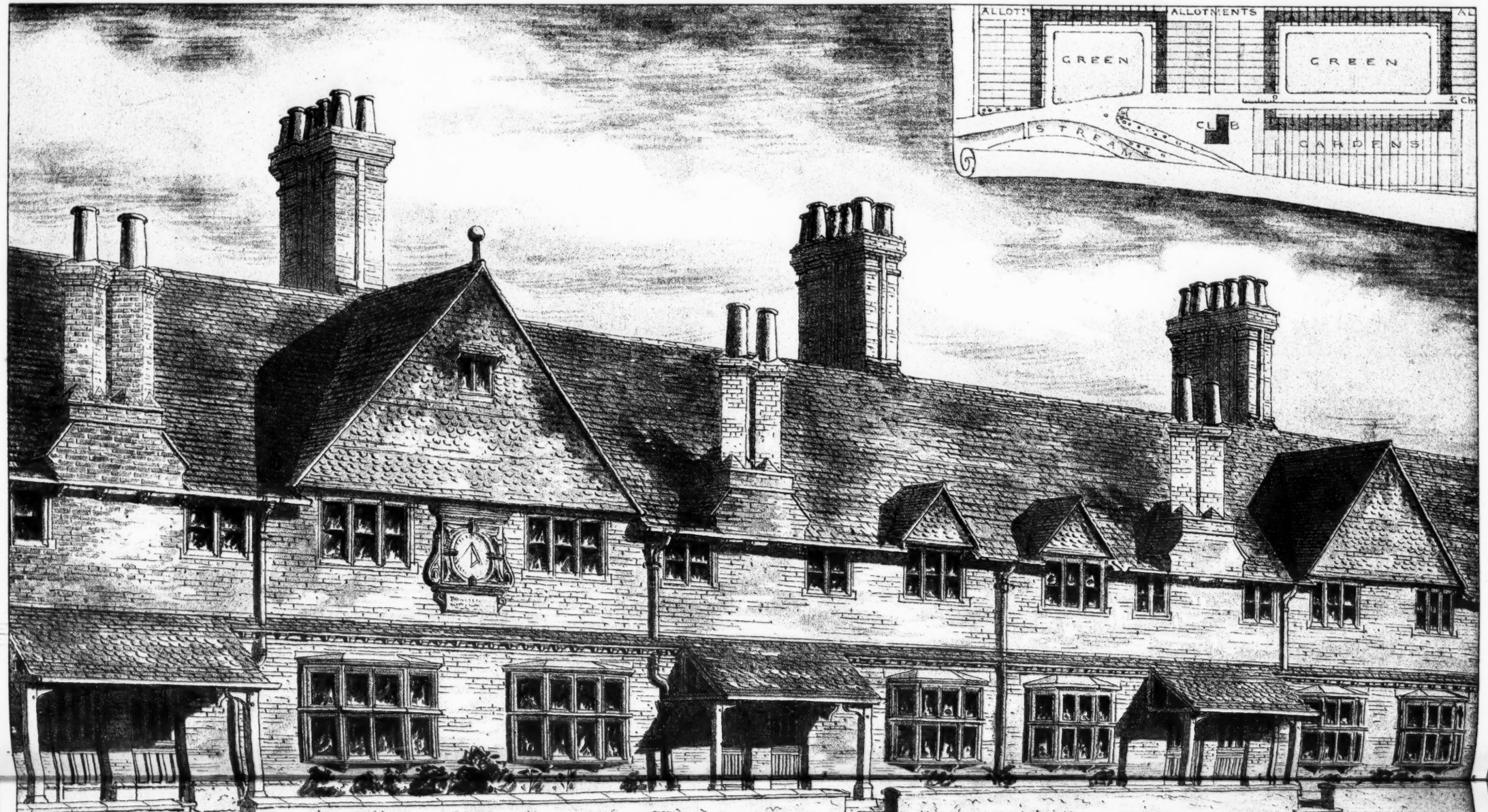
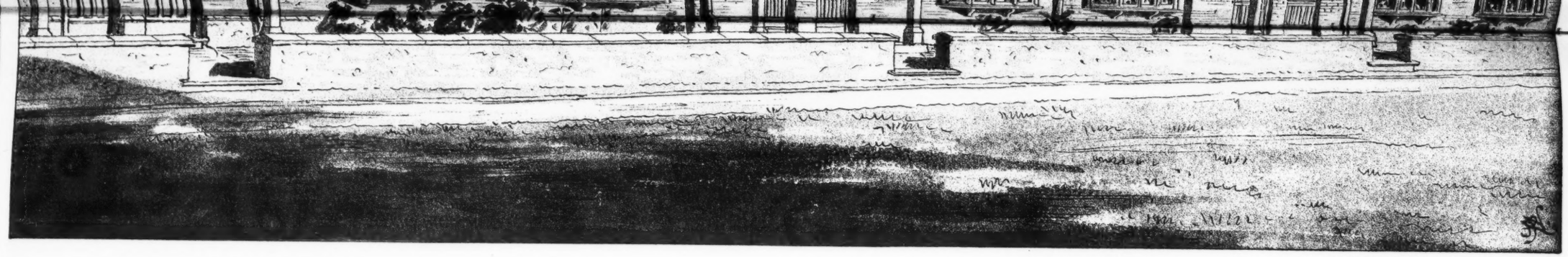
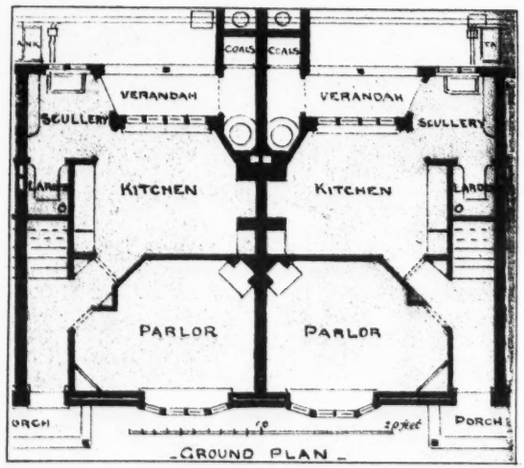


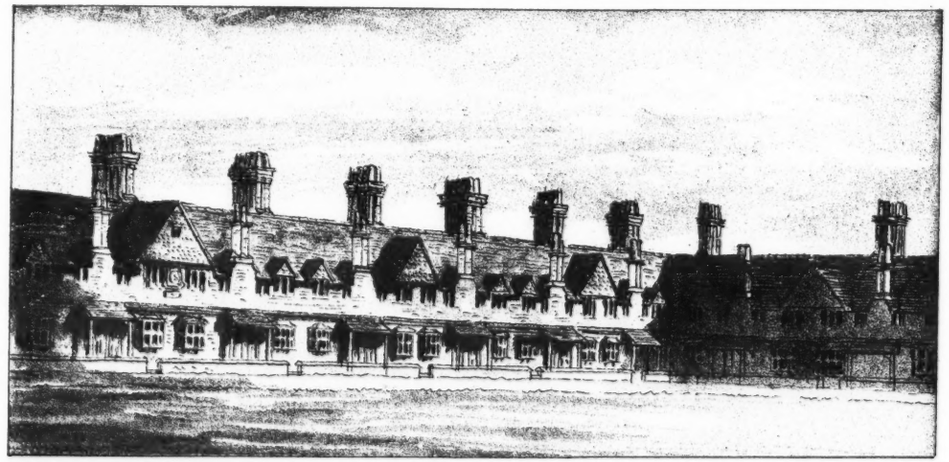
PHOTO-LITHO SPRAGUE & Co., 22, MARTINS LANE CANNON ST. LONDON, E.C.

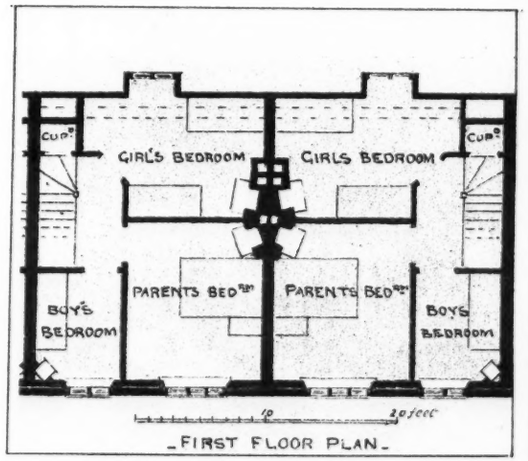
N.—Mr. R. D. Hansom, Architect.


ALLOTMENTS
GREEN
GREEN
CLUB
GARDENS
STREAM









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COTTAGE BLOCK FOR SOUTH WESTERN RAILWAY COMPANY.—Mr. Ralph Nevill, F.S.A., Architect.

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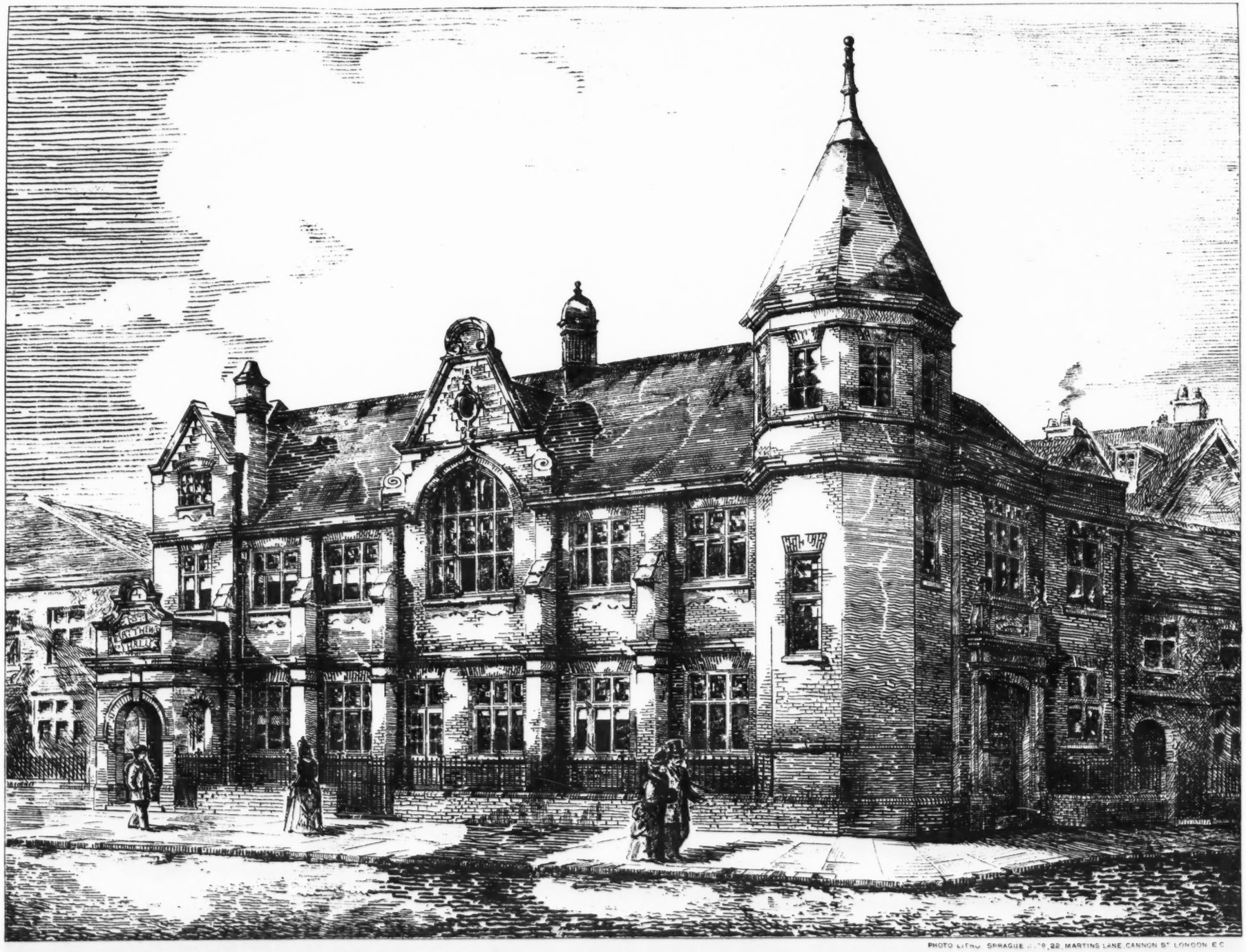
GATE LODGE, SANDOWN PARK, TUNBRIDGE WELLS.—Mr. Edwin T. Hall, F.R.I.B.A., Architect.



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ST. MATTHEW'S PAROCHIAL HALL, BRIXTON, S.W.—Mr. Edwin T. Hall, F.R.I.B.A., Architect.